(2)

NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

A COMPARATIVE ANALYSIS OF FACTORS AFFECTING THE CAREER ORIENTATION OF NAVAL OFFICERS AND FEDERAL CIVILIAN ENGINEERS

by

Thomas Edward Lindner

and

Mark Edward Davis

December 1989

Thesis Co-Advisors: Benjamin J. Roberts
Kenneth W. Thomas

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved
OMB No 0704-0188

1a REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b RESTRICTIVE MARKINGS
2a SECURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION/AVAILABILITY OF REPORT Approved for public release; distribution is unlimited
2b DECLASSIFICATION/DOWNGRADING SCHEDULE	
4 PERFORMING ORGANIZATION REPORT NUMBER(S)	5 MONITORING ORGANIZATION REPORT NUMBER(S)
6a NAME OF PERFORMING ORGANIZATION Naval Postgraduate School 6b OFFICE SYMBOL (If applicable) 36	7a NAME OF MONITORING ORGANIZATION Naval Postgraduate School
6c ADDRESS (City, State, and ZIP Code) Monterey, California 93943-5000	7b ADDRESS (City, State, and ZIP Code) Monterey, California 93943-5000
8a NAME OF FUNDING/SPONSORING ORGANIZATION 8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER
8c ADDRESS (City, State, and ZIP Code)	10 SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO / PROJECT NO / TASK NO / WORK UNIT ACCESSION NO

11 TITLE (Include Security Classification)
A COMPARATIVE ANALYSIS OF FACTORS AFFECTING THE CAREER ORIENTATION OF NAVAL OFFICERS AND FEDERAL CIVILIAN ENGINEERS

12 PERSONAL AUTHOR(S)
Lindner, Thomas E. and Davis, Mark E.

13a TYPE OF REPORT	13b TIME COVERED	14 DATE OF REPORT (Year Month Day)	15 PAGE COUNT
Master's Thesis	FROM ____ TO ____	1989, December	192

16 SUPPLEMENTARY NOTATION
The views expressed in this thesis are those of the authors and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)
FIELD	GROUP	SUB GROUP	Job Satisfaction; Organizational Commitment; Employee Turnover; Multivariate Analysis; Logit Regression; Turnover Model; Career Intent;

19 ABSTRACT (Continue on reverse if necessary and identify by block number)

This thesis examines factors that affect the career orientation of United States Navy Surface Warfare and Submarine designated officers and federally employed civilian engineers and scientists at the Naval Avionics Center. Biodemographic, tenure, satisfaction, and expectations-related variables were tested for correlation with intent to remain in the organization for the period of service corresponding to the derived definition of "career." The results were used to construct models for each of the above sample groups and the Logit regression procedure was used to measure the impact of each retained variable on career intent. Data for the military samples were taken from the 1985 DOD Survey. Data for the Naval Avionics Center sample were collected using a survey designed and administered by the authors. The thesis identifies different behavior patterns between the three samples. Additionally the thesis provides

20 DISTRIBUTION/AVAILABILITY OF ABSTRACT	21 ABSTRACT SECURITY CLASSIFICATION
☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	Unclassified
22a NAME OF RESPONSIBLE INDIVIDUAL Prof. Benjamin J. Roberts	22b TELEPHONE (Include Area Code) (408) 646-2792 / 22c OFFICE SYMBOL Code 54Ro

DD Form 1473, JUN 86 Previous editions are obsolete SECURITY CLASSIFICATION OF THIS PAGE
S/N 0102-LF-014-6603 UNCLASSIFIED

#18 - SUBJECT TERMS - (CONTINUED)

Officer Turnover; Federal Civilian Engineers; Surface Warfare Officers, Submarine Officers, Naval Avionics Center

#19 - ABSTRACT - (CONTINUED)

insight as to the relative and comparative impacts of the factors deemed significant and their potential influence on retention policy.

Approved for public release; distribution is unlimited

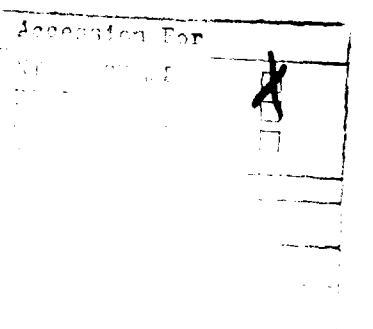
A Comparative Analysis of Factors Affecting the Career Orientation of Naval Officers and Federal Civilian Engineers

by

Thomas Edward Lindner
Lieutenant Commander, United States Navy
B.S., United States Naval Academy, 1977

and

Mark Edward Davis
Lieutenant, United States Navy
B.S., United States Naval Academy, 1983



Submitted in partial fulfillment of the requirement for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1989

A-1

Authors: Thomas E. Lindner Mark E. Davis

Approved by: Benjamin J. Roberts, Thesis Co-Advisor

Kenneth W. Thomas, Thesis Co-Advisor

David R. Whipple, Chairman
Department of Administrative Sciences

ABSTRACT

This thesis examines factors that affect the career orientation of United States Navy Surface Warfare and Submarine designated officers and federally employed civilian engineers and scientists at the Naval Avionics Center. Biodemographic, tenure, satisfaction, and expectations-related variables were tested for correlation with intent to remain in the organization for the period of service corresponding to the derived definition of "career." The results were used to construct models for each of the above sample groups and the Logit regression procedure was used to measure the impact of each retained variable on career intent. Data for the military samples were taken from the 1985 DOD Survey. Data for the Naval Avionics Center sample were collected using a survey designed and administered by the authors. The thesis identifies different behavior patterns between the three samples. Additionally the thesis provides insight as to the relative and comparative impacts of the factors deemed significant and their potential influence on retention policy.

TABLE OF CONTENTS

I. INTRODUCTION ---------- 1

A. THE NAVAL OFFICER COMMUNITY ---------- 3

B. THE NAVAL AVIONICS CENTER ---------- 7

C. FINDINGS ---------- 9

II. REVIEW OF LITERATURE ---------- 12

A. INTRODUCTION ---------- 12

B. RESEARCH FOCUS ON CIVILIANS ---------- 28

C. FOCUS ON THE FEDERAL GOVERNMENT ---------- 54

D. CONCLUSION ---------- 74

III. METHODOLOGY ---------- 77

A. PRELIMINARY ANALYSIS FOR MILITARY SAMPLES --- 83

B. PRELIMINARY ANALYSIS FOR NAVAL AVIONICS CENTER DATA ---------- 89

C. MULTIVARIATE ANALYSIS ---------- 96

IV. ANALYSIS OF MILITARY SAMPLES ---------- 97

A. THE SURFACE WARFARE COMMUNITY ---------- 97

B. THE SUBMARINE OFFICER COMMUNITY ---------- 104

V. ANALYSIS OF THE NAVAL AVIONICS CENTER SAMPLE ---- 112

A. CORRELATION ANALYSIS ---------- 112

B. MULTIVARIATE REGRESSION ANALYSIS ---------- 116

VI. COMPARATIVE ANALYSIS ---------- 120

A. PRELIMINARY SAMPLE COMPARISONS ---------- 120

B. COMPARISON OF SIGNIFICANT VARIABLES --------- 122

C. COMPARISON OF PARTIAL EFFECTS ---------- 128

D. CAREER ANCHORS ---------- 131

VII. CONCLUSIONS ---------- 135

A. RESEARCH CONCLUSIONS ---------- 135

B. RESEARCH WEAKNESSES ---------- 137

C. RECOMMENDATIONS FOR FUTURE RESEARCH --------- 139

APPENDIX A: NAVAL AVIONICS CENTER ORGANIZATION CHART ---------- 141

APPENDIX B: NAVAL AVIONICS CENTER DIAGNOSTIC SURVEY -- 143

APPENDIX C: COMPUTER ANALYSIS RESULTS (MILITARY SAMPLE) ---------- 154

APPENDIX D: COMPUTER ANALYSIS RESULTS (NAVAL AVIONICS SAMPLE) ---------- 164

APPENDIX E: RESULTS OF COLLINEARITY DIAGNOSTICS BY SAMPLE ---------- 171

LIST OF REFERENCES ---------- 176

BIBLIOGRAPHY ---------- 182

INITIAL DISTRIBUTION LIST ---------- 185

I. INTRODUCTION

Personnel turnover has become a major concern to those who have an interest in organizational behavior. Turnover results in considerable costs to individuals as well as organizations. Consequently much research concerning the phenomena of turnover has been done, including studies on both civilian and military communities. [Ref. 1]

The resignation of any Naval officer deals a costly blow to the Navy's manpower resource pool. Not only are the costs of countless hours of specialized training wasted, the costs of recruiting and training a replacement must be considered as well. Officer acquisition costs alone are about $195 million per year. [Ref. 2] In today's Navy, full of complex weapons systems and state-of-the-art technology, training costs can also be substantial. In addition, training simply cannot take the place of experience, and although difficult to quantify, this loss of experience is particularly costly. Consequently, retention is fiscally important.

A parallel concern exists in the large community of federal civilian engineers that work at numerous support facilities throughout the country. The loss of an experienced engineer entails replacement, recruiting, and training costs, as well as the loss of that engineer's experience.

The loss of experienced personnel creates "holes" in the organizational structure that must be filled by enticing an additional experienced officer or engineer to remain with the organization. Attrition also has a "domino effect" on initial recruiting and retention of military personnel, because the military must fill upper level vacancies by promotion from within. Essentially, these vacancies move down the organizational hierarchy as personnel are promoted upwards to fill them. This practice exacerbates the training problem, by creating more vacancies, which requires more training of personnel to fill them, which costs money and involves a substantial amount of administration. Eventually, the vacancy reaches the bottom the hierarchy, where it is then filled by a fresh recruit. On the other hand, civilian organizations can fill vacancies using lateral entry replacements who may already possess the skills required for the position to be filled. Of course some amount of attrition is necessary and expected, however to minimize manpower costs, the attrition of dedicated experienced personnel should be minimized.

This study focuses on the retention decision process and the factors that influence career choice among two naval officer communities and federal civilian engineers. The "employee" who eventually decides to leave must base his decision on some factor(s) that supports his decision, and it would be useful to know <u>not only what</u> they were, but <u>how</u> they affect the decision as well. The study will attempt to

identify the factors that support this decision process, and explore how they interact.

Specifically, this thesis attempts to study the retention decision process as it relates to the careers of male surface warfare designated Naval officers, submarine designated Naval officers, and federally employed civilian engineers at the Naval Avionics Center. Using correlation and multivariate analysis based upon previous research and original assumptions, the retention decision of these communities is modeled against several measures of job satisfaction, life satisfaction, biodemographics, and career experience.

A. THE NAVAL OFFICER COMMUNITY

The decision to stay or leave a job is based upon several factors. The Navy attempts to determine these factors through the use of separation surveys that are administered to officers leaving the service and retention surveys that are randomly administered to the force. The top ten reasons for leaving and remaining in the Navy are presented in Tables 1 and 2 respectively.

As one can see, the factors that affect retention and separation are not quite the same. A notable difference is the absence of pay as a dissatisfier, since it is commonly believed that military pay is inadequate; yet pay is included as a satisfier in Table 2. The responses involving "use of abilities, skills and "education" and "initiative" are

TABLE 1

REASONS FOR OFFICER SEPARATIONS, 1986

Ranking	Description
1	Too much family separation
2	Too much crisis management
3	Unable to sufficiently plan/control career
4	Suppressed initiative, creativity, and professional stimulation
5	Insufficient managerial/leadership qualities of seniors
6	Lack of recognition for accomplishment/ self-respect
7	Problems with assignment/detailing
8	Possible erosion of benefits
9	Job dissatisfaction
10	Poor utilization of abilities, skills and education

Source: CNO Memorandum 1040 ser. 136D21/6U377823 of 9 JAN 87

particularly interesting, since they indicate the fact that something can be a satisfier as well as a dissatisfier. Such responses make it difficult to determine how these factors affect the behavior in question.

The officer corps has rarely been looked at in detail. Yet,

> They run the largest enterprise in the United States and the most lethal military establishment in the world. They spend more than 31 percent of the federal budget. In the nuclear age, they literally hold the fate of the earth in their hands--despite the tradition of civilian control. They are the American military elite--the 299,000 officers. [Ref. 3:p. 1]

TABLE 2

REASONS FOR OFFICER RETENTION, 1986

Ranking	Description
1	To perform meaningful and challenging work
2	To obtain positions of responsibility and authority
3	To use abilities, skills, and education
4	Opportunity to serve my country
5	To pursue a career in a given specialty
6	To obtain a military retirement
7	To obtain good pay and allowances
8	Because there is opportunity to show initiative
9	To enjoy Navy lifestyle/Esprit de Corps
10	For opportunity to command

Source: CNO Memorandum 1040 ser. 136D21/6U377823 of 9 JAN 87

The U.S. military is the largest institution within the government. It is so large that its operation impacts on the economy, on class and minority policies, on science and research efforts, on education, on the legal system, and on national values.

Seventy-five percent of the military officer corps is in the O-2 to O-4 rank levels. In the Navy, which has about 29% of the total officer strength, the grade distribution is as depicted in Table 3. Of these, 42,960 are in the O-1 to O-3 category, 24,727 in the O-4 to O-6 category, and 256 are flag

rank. [Ref. 3:p. 3] Nearly 75% of all newly commissioned officers are between ages 21-25, and an overwhelming majority are college graduates. [Ref. 3:p. 7]

TABLE 3

NAVAL OFFICER GRADE DISTRIBUTION

Pay grade	Percent
O-1	15.3
O-2	14.6
O-3	33.1
O-4	19.8
O-5 TO O-10	17.2

Source: [Ref. 3:p. 3]

"With striking regularity, students of warfare have commented that the most important determinant of military success is the quality of personnel." [Ref. 4:p. 6] The nature of the threat to national security will no longer allow time for full mobilization and upgrading of military skills [Ref. 5:p. 1]. Retention of skilled junior officers is paramount to success in future conflicts, where it is generally acknowledged that the fight will be conducted with assets already on hand at the start of the conflict. Loss of these skilled people can cause several problems, including lack of experience in critical areas, less promotion selectability, and inefficient use of scarce training dollars.

B. THE NAVAL AVIONICS CENTER

The Naval Avionics Center is located in Indianapolis, Indiana. As of March 1989, the Naval Avionics Center employed 3320 permanent civilian personnel, 1149 of which were degreed scientists or engineers. The vast majority of these personnel are found in one of four of the nine departments that comprise the Center's organization. (A basic organization chart is provided as Appendix A.) These departments are "200" (Manufacturing Technology), "400" (Product Integrity and Assurance), "800" (Systems and Technology), and "900" (Engineering). As civil servants, they are salaried employees who are paid on standard regional government GS/GM pay scales.

The Center's mission is,

> ...to conduct research, development, engineering, material acquisition, pilot and limited manufacturing, technical evaluation, depot maintenance, and integrated logistic support on assigned airborne electronics (avionics), missile, spaceborne, under sea and surface weapon systems and related equipment. [Ref. 6]

It is a subordinate command of the Naval Air Systems Command and is typical of many large military industrial facilities, in that it has a small military staff (13 in this case) responsible for a large civilian labor force. Although it is technically a government facility, the Center competes for much of its work using the standard competitive bidding procedures for government contracts. Those departments that are "light-loaded" may even accept outside work. In these

respects, the Center is much like any privately operated industrial activity.

As part of an organizational effectiveness study of the Naval Avionics Center being conducted by the staff of the Naval Postgraduate School Administrative Sciences Department, the issue of turnover, particularly of engineers and scientists, was identified as a concern by the military staff. As expressed in the Center's own overview statement,

> ...the Center invests in a strong personnel training program designed to foster technical and managerial skills especially attuned to addressing the Navy's airborne electronics issues of today and tomorrow. In order to stay abreast of new philosophies in the systems acquisition process and the rapid advances in avionics technologies, the Center continually invests in the upgrading of its personnel's capabilities.
>
> As a result of these resource investment strategies, the Center has assembled an impressive array of professional and skilled personnel combined with well-equipped physical facilities. [Ref. 6]

In light of this personnel philosophy, which involves substantial investments in training and experience, turnover has an especially devastating effect on the Center's ability to stay abreast of technology and exploit the very strategy that it is attempting to build upon.

Although the Center does administer "leaver surveys" to departing employees, this data is not retained in any files. As a result, there is no historical data for use as a reference to determine the basic reasons for turnover or retention at the Center. This also makes it next to impossible to determine the demographics of those leaving the

Center, in terms of age, experience, and training. Figures on overall turnover are available, and they indicate that in the first two quarters of fiscal year 1989, attrition of engineers and scientists was running at 6.1 percent, 63 percent of which was due solely to voluntary resignation. Recruitment to replace those personnel leaving the Center is done on a piecemeal basis, with recruits being procured as vacancies occur. In other words, there is no annual recruiting program or recruit quota system based upon a forecasting model or other methodology.

Since the basic education requirements of federal civilian engineers, and line naval officers are similar, and the federal government must compete for recruits from the same manpower pool, this study will look for similarities and differences in turnover behavior between these communities.

C. FINDINGS

The purpose of this thesis was to identify factors affecting the career orientation of three sample communities--surface warfare officers, submarine officers, and federal civilian engineers--and to estimate the magnitudes of the effects of these individual factors using an original turnover model.

The research shows that each of the three sampled communities is affected by different factors in the career orientation of its members. First order correlation analysis

revealed that age, length of service, presence of dependents, satisfaction with family environment, unit morale, overall satisfaction with the organization, expectations that the family could be better off if the employee left the organization, and the employee's previous job search history were significant across all three sample groups. Education, spouse employment, and pay satisfaction were not significant for any of the sample groups.

Each of the sample communities exhibited unique correlates of turnover intent. The major differences across military community involved career agreement with spouse, satisfaction with work environment, satisfaction with job freedom, promotion expectations, and job satisfaction. The former two were significant only for the surface warfare sample, the latter three were significant for both military samples. The Naval Avionics Center data reveals that expectations concerning the availability of, as well as actual offers of, alternative employment were significant in the turnover decision process.

Logit regression analysis of each community revealed that the proposed model of turnover intent was supported in all three cases. All three models demonstrated at least 85.7 percent accuracy in predicting intent to stay, as shown in Chapters IV and V. Analysis also supports the conclusion that each community exhibits distinct trends in the types of variables affecting the turnover process. Specifically,

surface warfare officers are most influenced by dissatisfaction with the Navy and promotion opportunities, submarine warfare officers are most influenced by expectations of future duty and family environment, and Naval Avionics Center personnel are most influenced by family factors and job alternatives.

II. REVIEW OF LITERATURE

A. INTRODUCTION

There is an abundance of research on the subject of employee turnover related to civilian as well as military organizations. Most of this research focuses on explaining the nature of turnover, its determinants, and measurement of these determinants for predictive purposes. Much of the early work focused on the relationship between the construct of job satisfaction and turnover. "The term 'job satisfaction' is generally taken to mean the employee's general attitude toward certain aspects of the job, the work itself, supervisor, coworkers, and so on." [Ref. 7]

1. Job Satisfaction

Job satisfaction is one of the most widely researched areas in industrial and organizational psychology. It is estimated that well over 3000 articles have been published on the subject. This overwhelming interest is due to cultural and functional reasons. Culturally, as a nation, America tends to value individual freedom, personal growth, and opportunity. Functionally, satisfaction has been shown to be related to such job related aspects as turnover and performance. [Ref. 8:p. 394]

Job satisfaction is an emotional, affective, and individual response to a work situation. Many factors

contribute to how an individual feels about a job. Global satisfaction is a measure of overall feeling for a job (macro level) and as such, is not concerned with individual components that make up satisfaction. Facet satisfaction is a measure of feelings for individual elements of a job (micro level), and is based on the idea that "a job is not an entity but a complex inter-relationship of tasks, roles, responsibilities, interactions, incentives, and rewards." [Ref. 8:p. 397]

There are an indeterminant number of job facets affecting the satisfaction levels of individual workers. In addition, each worker is affected by, and each job is composed of, different facets. Locke [Ref. 8:p. 395] has summarized many of the more common facets in Table 4.

In order to understand the relationships between job satisfaction and turnover, the relevant theory must be examined. As stated by Muchinsky:

> Several theories have been proposed to explain why people are satisfied with their jobs. None of them have garnered a great deal of empirical confirmation, which suggests that job satisfaction is a complex phenomenon with many causal bases. [Ref. 8:p. 399]

Muchinsky presents four general approaches to job satisfaction: intrapersonal comparison, interpersonal comparison, opponent-process theory, and the two factor approach. [Ref. 8]

Intrapersonal comparison approaches compare what an individual wants from a situation (the standard) to what the

TABLE 4

EFFECTS OF VARIOUS EVENTS, CONDITIONS, AND AGENTS ON JOB SATISFACTION

Source	Effect
Events or conditions:	
Work itself: challenge	Mentally challenging work that the individual can successfully accomplish is satisfying.
Work itself: physical demand	Tiring work is dissatisfying.
Work itself: personal interest	Personally interesting work is satisfying.
Reward Structure	Just and informative rewards for performance are satisfying.
Working conditions: physical	Depends on match between working conditions and physical needs.
Working conditions: goal attainment	Working conditions that facilitate goal attainment are satisfying.
Agents:	
Self	High self-esteem is conducive to job satisfaction.
Supervisors, coworkers, subordinates	Individuals will be satisfied with colleagues who help them attain rewards and see things the way they do.
Company and management	Individuals will be satisfied with companies that have policies and procedures designed to help them attain rewards.
	Individuals will be dissatisfied with conflicting and/or ambiguous roles imposed by company and\or management.

TABLE 4 (CONTINUED)

Source	Effect
Fringe benefits:	Benefits do not have a strong influence on job satisfaction for most workers.

Source: [Ref. 8:p. 398]

individual actually receives. The degree of satisfaction is a function of the difference between the two; the smaller the difference, the larger the satisfaction level. The standard is derived from two potential sources: human needs or human values. The needs approach, as proposed by Maslow and others, suggests that basic human needs, such as food and air (physical), and self esteem or companionship (psychological), must be met in order to provide satisfaction. Maslow's need hierarchy system states that behavior is dominated by attempts to satisfy unfulfilled needs, and that lower level needs must be met before higher order needs become important. The theory has several important implications for work satisfaction. When pay and security are poor, employees focus efforts on fulfillment of those needs. As conditions improve, these needs become fulfilled and less important. Now the behavior of supervisors and co-workers takes on increased relevance. If these aspects become satisfactory, then the nature of the work itself can become the paramount concern [Ref. 8:p. 452].

This view however, seems too simplistic to explain the complexities of human behavior.

The values approach to derivation of the standard defines "values" as what a person desires or seeks to attain on the job. The approach assumes that all people have the same basic needs, but each individual places a different value on fulfilling each need. Therefore, values determine personal choices and the emotional responses to job-related stimuli. [Ref. 8:p. 399]

Interpersonal comparison processes, on the other hand, are concerned with individuals comparing themselves to others in assessing their own feelings of job satisfaction. Comparisons of equity are made within social systems, and as such are not needs- or values-based. The standard is determined on a relative basis, where individual workers are constantly comparing their individual perceptions concerning pay, benefits, assignments, and position, to those received by their peers in the workplace, and deriving a personal judgment concerning the equity of their work situation relative to others. Satisfaction is a result of the perceived equity of their position. [Ref. 8:p. 400]

Opponent-process theory is based on the notion that satisfaction is a physiologically-induced reaction. The central nervous system controls satisfaction levels and provides a counter response to any emotional stimuli. If an individual is happy, an opponent response attempts to return

him to a neutral level. Varying degrees of satisfaction resulting from a stimulus (i.e., the job) are due to the varying stages of this opponent response. The theory does allow for the explanation that satisfaction can change over time, even if the job remains the same. Each time the opponent response mechanism is triggered, it becomes stronger. Repeated exposure to the same stimuli (i.e., job) results in a strong physiological response that prohibits pleasure (satisfaction), resulting in boredom that is due to repeated exposure, not the job itself [Ref. 8:p. 402]. This theory has received little support by researchers, and is contrary to findings in most studies of satisfaction that are supported by a substantial body of sound research.

Frederick Herzberg's work was some of the first to attempt to explain satisfaction as more than a simple construct related to a single type of variable. He proposed a two-factor theory of satisfaction, using the concepts of content and context factors. Content factors relate to a job's contents and include such aspects as recognition, advancement, responsibility, and achievement. They affect the way a person feels about his individual job, aside from how he feels about the organization. When these factors are present in a job, they will lead to satisfaction. However, when they are absent from a job, they lead to indifference and <u>not</u> dissatisfaction. Context factors are related to a job's context and can cause dissatisfaction. When these factors,

such as company policy, supervisory styles, salary, and work conditions are inadequate in a job, they will lead to dissatisfaction. When they are present and adequate, they lead to indifference, not satisfaction.

Later studies have shown Herzberg's work to be simplistic because they have shown that content and context factors, and their effects, are interrelated. However, the study is important because it provides a look at the complexity of the problem of determining the various antecedents of job satisfaction and how they affect behavior.

Each of these theories has contributed to the understanding of job satisfaction. Currently, the two-factor theory is the more popular in terms of research generated, but the comparative-process theories are seen as the most defensible. [Ref. 9:p. 402] It seems unlikely that researchers will develop the theory of job satisfaction. Such a theory "would be an integration of the existing theories, each of which explains a component of job satisfaction [Ref. 8:p. 402].

2. Organizational Commitment

Another important construct to understand in the study of turnover behavior is "organizational commitment." "Organizational commitment is an employee's identification with and involvement in his/her organization." [Ref. 10:p. 281] Steers considered it to be a function of strong belief and acceptance of organizational goals, a willingness to exert

effort on behalf of the organization, and a strong desire to maintain organizational membership [Ref. 11:p. 46]. Using this construct, quitting implies rejection of the organization, and not necessarily rejection of the job. It is important to understand the implications of organizational commitment, because much of the recent research uses it or some variation of it as an explanatory variable affecting the turnover process.

In all, at least 25 variables have been found to be in some way related to organizational commitment, covering such various areas of organizational life as roles, work experience, organizational structure, and personal characteristics. [Ref. 12:p. 35]

The work of Porter, Steers, and Mowday (1982) [Ref. 12] explained the concept of organizational commitment in great detail as part of their study titled, "Employee-Organization Linkages".[1] They assume that all organizations are concerned with the linkages they maintain with their employees, stating, "There appears to be a growing and justified concern on the part of organizations regarding the causes- and cures-for reduced employee commitment and increased turnover." [Ref. 12:p. 1]

Much of the more recent research on organizational commitment and its determinants has focused on the dynamic

---

[1]This study was funded by the Office of Naval Research.

nature of the workplace in the past 20 years. In an era of rapidly changing societal values and norms, examination of these changes provides an important basis for variables affecting employee attitudes and organizational commitment. The changes occurring in the workplace can be grouped into four categories: socionormative, demographic, economic, and technological.

Socionormative changes refer to those environmental changes that alter the behavioral norms of employees. These changes influence the work place in several ways, including through the socialization process occurring prior to employment, through the normative beliefs of co-workers, and through the individual's general knowledge of happenings in society. They may have a fundamental effect on the nature of work ethics, aspiration levels, attitudes toward authority, and trust in organizations. Kerr (1979) referred to the current "great American cultural evolution in the work force," in which more people want jobs, more people want jobs perceived as being "good," there is increased emphasis on individual rights and personal fulfillment, and there is an increase in indulgence of psychic-satisfaction [Ref. 12:p. 9]. Yankelovich (1979) identified a "New American Breed" which feels that success alone is not enough to satisfy yearnings for self-fulfillment; the demand is for full enjoyment and full employment [Ref. 12: p. 9]. Katzell (1979) summarized

current cultural trends expected to influence work environments in the immediate future:

- revised definition of success which places less emphasis on material achievement and more on personal fulfillment
- growing belief on entitlement to the "good life"
- increased conviction that organizations are obliged to contribute to the quality of life
- growing belief that there is more to life than working
- more concern by employees with long range implications fo jobs and job choice
- greater relative importance of autonomy, responsibility, achievement, and related psychic rewards in relation to material or comfort considerations
- less motivation to work long and hard just out of habit or conscience
- increasingly greater expectations of explanations and payoffs in both material and psychological terms. [Ref. 12:p. 10]

Katzell further states:

> It seems that in contemporary American society changes are taking place that are altering individuals basic beliefs about what is acceptable in how they relate to the work situation. Socionormative changes may be more profound than any other category of the external environment in having potential for affecting employee-organizational linkages. [Ref. 12:p. 10]

The changing composition and characteristics of the labor force are the primary demographic factors impacting on employee-organization linkages. Such aspects as educational levels, age, women and minority percentages, and dual career households are particularly important. Increasing education levels affect what workers want and expect from a job in terms of work environment, conditions, and rewards. These

expectations affect the types and quantity of incentives and supervision that will be effective in motivating individual employees toward increased outcomes and desired opportunities. The aging of the work force, a well-documented occurrence, will have the same effect. In addition, the increase in dual career households will tend to reduce individual psychological, monetary and dependence links to an organization as the other spouse provides "fallback" support, allowing more employee mobility. [Ref. 12:p. 9]

The general economic environment in which the organization exists will also affect the strength of linkages. Short-term economic effects include the relative prosperity experienced at a particular time, which can strongly influence employee motivation to maintain organizational membership or seek more attractive alternatives. Long-term economic impacts include the generally upward trend in affluence level which allows for more employee leisure time, which in turn may result in the job occupying a relatively smaller portion of the total life. [Ref. 12:p. 11]

Technology changes can have numerous effects on the work place. One impact is the rapid obsolescence of particular jobs and sectors of the economy, which affects employee relations and commitment to an organization. Technology has also resulted in increased specialization within organizations, which simultaneously can make an employee less mobile, due to firm specific job skills, and

more mobile, due to demand for his particular skills. This can lead to a shift of employee focus from the organization to the profession [Ref. 12:p. 12].

Taken as a whole, the collective impact of work environment changes on employee-organization linkages seems to point to significantly reduced or weakened links. "Quality of membership, in terms of loyalty and commitment, is likely to be reduced." [Ref. 12:p. 13] From the employee's perspective, weakened ties to the organization can provide a "freedom" that can make it psychologically and physically easier to leave. However, this "freedom" is not without costs. It is unclear whether performance accomplishments are transferrable between organizations, and thus in a new environment satisfaction and commitment may flounder if performance fails to reach previous and expected levels. In addition, psychologists have stressed the idea that individuals need to feel attached to something; reduced attachment to the work place due to "freedom" may have an adverse impact on psychological well-being if suitable outside attachments are lacking [Ref. 12:p. 14].

From the organization's perspective, weakened linkages can mean increased costs to replace departing employees, disrupted operations, increased training and development costs, and decreased social integration and work force cohesiveness. However positive effects such as increased production potential if poor performers leave, enhanced morale

if disruptive workers leave, new energy and fresh ideas brought by new employees, and improved motivation and performance as promotion opportunities increase, exist as well. [Ref. 12:p. 16]

"Although we know a good deal about variables that are empirically related to commitment, we know far less about the psychological processes in its development." [Ref. 12:p. 28] Most of the research on commitment is correlational in nature, and various measures of the construct have been used. Steers' (1977) research used the Organizational Commitment Questionnaire (OCQ), a 15 item questionnaire which essentially asks the employee how strongly he feels about the organization that employs him. Steers suggested that the major influences on organizational commitment could be grouped into three general categories: personal, job-related, and work experiences, and his initial use of the OCQ supported this contention. In his study of 119 R&D scientists and engineers, he found that work experiences had the highest correlation with commitment, followed by personal characteristics and job characteristics. [Ref. 12:p. 29] A description of each of these categories is provided in the following paragraphs.

"Work experiences are viewed as a major socializing force and as such represent an important influence on the extent to which psychological attachments are formed with the organization." [Ref. 12:p. 34] Hrebiniak (1974) and Steers (1977) both found that employees who feel needed or important

to an organization's mission are more highly committed, as are those who feel that the organization can be depended upon to look after employees' interests and those whose expectations are met in the work place. Another relevant factor is the extent to which employees sense that their co-workers maintain positive attitudes toward the organization (Buchanon, 1974; Steers, 1977). Perceived pay equity and group norms towards hard work, measured using attitudinal surveys, have also been shown to be related to commitment. Only a few studies have been conducted concerning leadership style and initiating structure, however both have been shown to be related to commitment (Morris and Sherman, 1981; Brief, Alday, and Walden, 1976) [Ref. 13]. Social involvement in the organization also facilitates commitment, the greater the social interaction, the more social ties the individual develops with the organization. [Ref. 12]

Personal correlates of commitment studied include age, tenure, education level, gender, race, and personality factors. Age and tenure have been found to be either positively related (Angle and Perry, 1981; Morris and Sherman, 1981) [Ref. 13] to commitment or indirectly related (Steers, 1977). Mowday et al. concluded:

> As age and tenure in the organization increases, the individual's opportunities for alternative employment become more limited. The decrease in an individual's degrees of freedom may increase the perceived attractiveness of the present employer. [Ref. 12:p. 30]

Education has also been found to be inversely correlated to commitment (Steers, 1977; Morris and Steers, 1980). This may be the result of highly educated employees having higher expectations that the organization may be unable to meet. There is also a possibility that highly educated individuals are more committed to a profession than an organization, and find it difficult or unnecessary to develop high levels of organizational commitment.

Several personality factors have been shown to be correlated with commitment, including achievement motivation, sense of competence, personal work ethic, and central life interest [Ref. 12:p. 31]. Research has also shown that "there appear to be at least three related aspects of work role that have potential to influence commitment: job scope or challenge, role conflict, and role ambiguity." [Ref. 12:p. 32] Increased job scope increases challenge, which tends to increase commitment (Steers, 1977). Role conflict is inversely related to commitment, whereas the findings on ambiguity are mixed (Morris and Koch, 1979: Morris and Sherman, 1981). Stevens et al. (1978) found that role overload, or the inability of the employee to assume the role that he perceives he should be filling, due to other demands or stress from within, has been found to be strongly and inversely related to commitment.

> The portrait that emerges with respect to the impact of role related factors on commitment is that such influences may be positive so long as the employee has clear and challenging

assignments. Where the assignments become ambiguous, place the employee in conflict, or provide excessive role stress, the effects on commitment tend to be adverse. [Ref. 12:p. 32]

Further studies (Steers and Manis, 1981; J.M Stevens, 1978) suggest that a fourth category of commitment antecedents called "structural characteristics" is necessary. Few studies have been conducted using structural correlates of commitment, which include organization size, union presence, centralization of authority, ownership by workers, and presence of participative decision making. Stevens et al. (1978) and Steers (1980), again using the Organizational Commitment Questionnaire, found that organization size and span of control were not related to commitment. However, Steers (1980) did determine that "employees experiencing greater decentralization, greater dependence on the work of others, and greater formality of written rules and procedures felt more committed." [Ref. 12:p. 33] In addition, employees vested with a financial interest in the organization or worker ownership, as well as those who participate in the decision making processes, have enhanced commitment levels. The structure of the organization also seems to influence commitment [Ref. 12:p. 34].

For what types of employees are the strongest linkages needed? Organizations may desire to sever membership ties of some employees and increase those of other more desirable

employees. Desirable employees should be the targets of organizational retention efforts. [Ref. 12:p. 208]

When will organizations need strong linkages? The importance of employee linkages may also be influenced by the organization's stage of development. The strength of employee linkages may be less crucial in organizations that have become stable. In fact, stable organizations may find it desirable to maintain moderate turnover rates to ensure an influx of new people or opportunities for upward mobility for employees [Ref. 12:p. 209].

Studies of turnover have looked at a myriad of professions and used numerous variables in their attempts to explain the decision to quit or stay on the job. The following sections summarize a number of key studies concerning both civilian and military samples.

B. RESEARCH FOCUS ON CIVILIANS

An early study by Mobley (1977) [Ref. 8] hypothesized several links between job satisfaction and quitting. Mobley contended that:

> Feelings of dissatisfaction provoke thoughts of quitting, which in turn prompt the search for another job. If the costs of quitting are not too high and the other job looks good, this will stimulate the intention to quit, followed by actual quitting. [Ref. 8:p. 427]

Muchinsy and Tuttle [Ref. 14] summarized 39 studies of this relationship and found it to be negative in all but four studies.

This basic idea was also expressed by Stolzenberg and Winkler [Ref. 15], however they further developed the relationship between turnover and satisfaction by proposing that actual quit behavior did not take place until a better alternative had been found. Failure to find a more attractive alternative would lead to a reassessment of "satisfaction" on the part of the employee, thus delaying or halting actual quit behavior.

The differentiation between actual quitting and intent to quit was a concern in most early studies, since it was felt that "only intention to quit was proposed to affect turnover directly." [Ref. 16:p. 3] The issue of concern was that intentions did not necessarily equate to actual behavior, and that use of intentions to predict turnover might lead to faulty research results. Waters, Roach, and Waters' research [Ref. 17] in this area found that "perhaps the best predictor of turnover can come from the employee's direct estimate of his future tenure." [Ref. 17:p. 2] In a study of 152 clerical employees, they found that "the single intent to remain with the company item correlated higher with termination than any satisfaction scale or biographical variable." [Ref. 17:p. 58] Of course this makes sense, since an employee that indicates an intent to leave is indicating a likelihood of following through with the intended act, or he may be a disgruntled employee that will adopt negative behaviors which ultimately lead to involuntary termination.

Mobley et al. [Ref. 18] recognized the issue as well, explaining that:

> Behavioral intentions to stay or leave are consistently related to turnover behavior. It is also evident that this relationship generally accounts for more variance in turnover than does the satisfaction-turnover relationship ....it is possible that intentions also capture the individual's perception and evaluation of alternatives. [Ref. 18:p. 505]

Mobley et al. further stated that:

> Although the relationship between intentions and turnover appears to be consistent and generally stronger than the satisfaction-turnover relationship, it accounts for less than 24% of the variance. Among the possible reasons for this are that intentions do not account for impulsive behavior,... and along with personal, organization, and external conditions, they may change between original measurement and the observation of actual behavior. [Ref. 18: p. 505]

Mobley et al. [Ref. 18] felt that "the immediate precursor to behavior is thought to be intentions...therefore the best predictor of turnover should be intention to quit." [Ref. 18:p. 517] The complex issue of behavioral intentions was the focus of work conducted by Fishbein (1967) and later Fishbein and Ajzen (1973,1975), and summarized by Hom, Katerburg, and Hulin [Ref. 10]. They proposed a behavioral intentions model that viewed behavior (B) as a function of behavioral intentions (BI), which,

> ...in turn, were a function of two determinants: (a) attitude toward performing the behavior (Aact) and (b) a subjective norm regarding the behavior (SN). Algebraically, this hypothesis may be expressed as

$$B = f(BI)$$

$$BI = w1Aact + w2SN + e$$

where w1 and w2 are theoretical weights but are usually empirically estimated using multiple regression coefficients. [Ref. 10:p. 281]

Fishbein felt that behavioral intent, B_I, was the key intervening variable between attitude and behavior, and as such, should be the single best predictor of behavior. The attitudinal component of the model was postulated to show a stronger relationship to the actual behavior, rather than to the object or target toward which the action is directed (namely, the job). Most studies tended to focus on attitudes about the object (or job), therefore Fishbein's work was unique in this respect, since it focused on the individual's attitude about the intended behavior (such as quitting the job). The social component of the model is a function of the person's beliefs about the importance that significant others place upon the behavior, or their normative beliefs (NB), weighted by the motivation to comply with others' beliefs (MC). Pomozal and Jaccard (1976) enhanced the model by adding a component to account for personal normative beliefs (personal NB), which were felt to impact upon the social component of the model. They felt that the addition of this component would account for the moral obligation the individual had to perform the act. [Ref. 10:p. 282]

Newman [Ref. 19] looked at turnover using Fishbein's model. Reviewing nine laboratory studies, Newman found an average correlation between behavior intention and actual behavior of approximately .70. However, Newman's own study

of 108 nursing home employees found a .39 correlation between intent to leave and voluntary termination, far below the average results of previous studies. Fishbein's model was unique in that it dealt solely with attitudinal measures. However, these measures are often difficult to measure consistently, particularly since they may change over time, and his model appears too narrow to adequately describe the complexity of the turnover decision.

Hulin [Ref. 9] approached the job satisfaction-turnover relationship from a different perspective, reporting on the results of a program designed to increase job satisfaction and decrease turnover. The Job Description Index (JDI) was used to measure five aspects of job satisfaction: satisfaction with the work itself, supervision, promotion opportunity, pay, and co-workers. The initial survey revealed dissatisfaction in all areas. The company chose to attack the problems in the pay and promotion areas, because these were the areas that were most fully under the company's control. Employees stated that dissatisfaction with pay was not only with pay level, but with salary administration as well. Dissatisfaction with promotion opportunities was due to individuals' perceptions that they were stuck in "dead-end" jobs. As a result, the following changes were made: merit raises and regular salary reviews were instituted, intercompany transfers and job rotation were encouraged to enhance promotability, and some job redesign was done to increase responsibility. The changes

resulted in a turnover decrease of from 30% of the company per year before the changes, to only 12% turnover afterwards. Hulin cautioned that although enhanced job satisfaction appeared to reduce turnover, since this was not a true experimental study, several other possible explanations for the decreased turnover were possible. These included changed labor market conditions and random uncontrollable factors.

Hulin's findings were congruent with the findings of Katzell and Yankelovich (1987) [Ref. 20]. The purpose of their study was to review the relevant literature to determine the relationships among monetary incentives, job satisfaction, stress, and performance. The impetus for this study was the growing concern about the effects of attempts to improve organizational efficiency through increased productivity and enhanced employee performance. Although such efforts can yield higher pay and satisfaction for affected employees, they can also lead to undesired outcomes and have major impacts on the work and work environment of individual employees, particularly in the areas of job satisfaction and stress.

Katzell and Yankelovich (1975) concentrated their study of job satisfaction on just two variables: incentives and performance. Job satisfaction was defined as consisting of the five factors measured by the Job Descriptive Index. They reviewed 300 studies on motivation and job satisfaction in an attempt to show that financial incentives were the most effective way to improve both. Cherrington (1971) determined

that the relationship between performance and job satisfaction is dependent upon performance-contingent rewards. Greene (1973) found that the opportunity for earning merit pay can cause satisfaction, although no relationship was found between the level of incentive and job satisfaction. Mottaz [Ref. 21], in a study of 1385 workers in various occupations found that work rewards, intrinsic and extrinsic benefits obtained from the job, such as compensation, benefits, co-worker interaction, and task rewards, "are the key determinants of organizational commitment." [Ref. 21:p. 474] Katzell and Yankelovich concluded that satisfaction variables operate in a complex fashion, influenced not only by incentives, but also by many individual and environmental variables. [Ref. 20:p. 29] In effect, their work failed to support their hypothesis.

In looking beyond the direct satisfaction-intent-turnover relationship, research on the specific factors of job satisfaction by Proctor, Lassiter, and Sayers [Ref. 22] indicated that intrinsic factors such as organizational climate affect the behavioral process of quitting more than extrinsic ones. In a review of relevant literature on employee turnover, Muchinsky and Tuttle [Ref. 14] found that satisfaction, and hence turnover, are functions of biodata information, personal factors, attitudinal factors, and work-related characteristics. Mobley (1977) [Ref. 23] attempted to combine many of these aspects into his multi-step decision process model regarding turnover, which allowed consideration

of some individual factors (such as the employment of spouse) and economic conditions, as intermediate linkages to turnover. Citing ten separate studies to support the use of intent to quit as an acceptable proxy for actual turnover, Mobley focused his research upon determining the factors affecting intent to quit, rather than the behavior of quitting itself. Mobley found that the factors which best predict intent to quit, and thus turnover, are age, tenure, job content, intention to remain on the job, and organizational commitment. Miller, Katerburg, and Hulin [Ref. 24] evaluated a reduced form of the model, using the major components of withdrawal cognitions (intentions), job satisfaction, career mobility, and actual withdrawal behavior as relevant factors in the turnover process. Using a sample of 460 National Guard members, Miller et al. found that age and satisfaction were both related negatively to turnover, and that surrogate measures of mobility (tenure, probability of finding a better job), were positively related to turnover. Miller et al. also found that "job dissatisfaction does not lead directly to turnover but does so conditionally on favorable search utility, successful search, attractive work alternatives, and action toward resignation." [Ref. 24:p. 510] They also tested the contention made by Mobley, based upon the work of Armknecht and Early (1974), that actual quit behavior was closely related to economic conditions [Ref. 23]. Miller et al. found that the effects of economic considerations on the

Mobley (1977) model were minor, stating that "labor market perceptions may influence resignation behavior only under extreme circumstances (e.g., economic recession) acting as a constraint on negative affect being translated into turnover." [Ref. 24:p. 512] The results of this study, which looked at the economic era of the mid-1970's, may not be relevant in today's economic environment.

Mobley, Horner, and Hollingsworth (1978) [Ref. 25] investigated the cognitive and behavioral phenomena that occur "between the emotional experience of job dissatisfaction and the withdrawal behavior." [Ref. 25:p. 408] They concluded that the satisfaction-turnover relationship was indirect and dependent on intent to search, intent to quit, and perceptions about alternative employment. As a result of this research, the Mobley (1977) model was updated to allow for the consideration of intent to quit, intent to search, thinking of quitting, overall satisfaction, age-tenure, and probability of finding an acceptable alternative. Dalessio, Silverman, and Schuck [Ref. 26] tested this model on several different samples, and found that the probability of finding an acceptable alternative was related directly to thinking of quitting, but not to intent to search or intent to quit. A possible explanation for this result is that as one actually approaches, or reaches the decision to quit a job, the evaluation of alternatives becomes more realistic, so that the indicated probability of finding an acceptable alternative is

lower. In addition, job satisfaction was found not to relate significantly to intent to quit, but the overall contention of the Mobley et al. (1978) model was supported.

Mobley, Griffeth, Hand and Meglino (1979) [Ref. 18], in a study based upon further research surrounding Mobley's (1977, 1978) original work, devised a seemingly more complex model, taking into account individual differences and impulsive behavior, as well as the interrelated constructs of job attraction, attraction of alternatives, and individual work values and life values. Michaels and Spector [Ref. 27] tested this model, adding confirmed pre-employment expectancies and organizational commitment variables to the original model. They proposed that individual factors (salary, tenure, age, confirmed expectancies) and organizational factors (perceived job characteristics and consideration behavior by supervisors) would lead to job satisfaction and organizational commitment, which in concert with perceived employment opportunities, would lead to intention of quitting, which would then lead to turnover. Using zero order correlations and path analysis, their research supported the Mobley et al. (1979) model, except that perceived alternative employment had only an indirect impact on turnover, through its effect on job satisfaction. They did find that job satisfaction and organizational commitment affected intention to quit, which was found to be the direct precursor to turnover. [Ref. 27]

The importance of consideration of alternative employment was the basis of work done by Thibault and Kelley (1959), and summarized by Stolzenberg and Winkler [Ref. 15]. Their work was based upon a rational cost-benefit analysis model of behavior, using the concepts of **Comparison Level** and the **Comparison Level of Alternatives.** Comparison Level represents how satisfied a person is with membership in an organization. Comparison Level of Alternatives measures satisfaction relative to the most satisfying alternative to the present organization. Thibault and Kelley (1959) found that persons become disgruntled when the Comparison Level is low, but they do not necessarily leave their jobs unless their Comparison Level sinks below the Comparison Level of Alternatives. Citing the work of March and Simon (1958), Stolzenberg and Winkler expanded upon the model by stressing that perceived, rather than actual, alternatives form the basis for the Comparison Level of Alternatives, and although satisfaction itself may not be sufficient to cause voluntary termination, it precipitates the search for alternatives. This view also allows for a reassessment of the level of the Comparison Level if the search for a better job is unsuccessful, such that the comparison process between the Comparison Level of Alternatives and the Comparison Level, favors the Comparison Level. [Ref. 15]

The construct of organizational commitment was the focus of work done by Porter, Steers, Mowday, and Boulian (1974) and

Porter, Crampon, and Smith (1976), and summarized by Hom et al. [Ref. 10:p. 281]. Although addressed above, there are several additional aspects of the relationship between organizational commitment and turnover that are worthy of note.

Several consequences of organizational commitment have been studied, including job performance, tenure, absenteeism, and turnover. Of these, turnover is the most important and "most predictable behavioral outcome of employee commitment" [Ref. 12:p. 38]. At least eight studies have been conducted on the commitment-turnover relationship. Highly significant correlations between commitment and turnover have been found (Hom et al. 1979; Mowday et al., 1979; Steers, 1977). Porter et al. (1974) conducted a longitudinal study to track commitment levels over time and found that commitment was inversely and significantly related to turnover, and that the magnitude of this relationship increases over time. "Commitment attitudes develop slowly over time and increase with employee tenure...commitment proved to be a moderately better predictor of subsequent turnover than did the more traditional attitude measure of satisfaction." [Ref. 12:p. 39]. A related finding from a study conducted by Porter et al. (1976) showed that:

> ...if a leaver is within a couple of months of leaving, his or her (commitment) attitudes are clearly lower than those of comparable stayers; on the other hand, if he or she is at least six months away from leaving, his or her attitudes are

indistinguishable from those of someone who is not going to leave in six months. [Ref. 12:p. 40]

One of the weaknesses of studies involving organizational commitment is that:

> It is important to recognize that previous research on the antecedents of organizational commitment, has, almost without exception, been cross sectional in design. Investigators have collected questionnaire data from employees at one point in time and correlated commitment with a number of different measures. Although these studies are useful for identifying the types of personal, job-related, and organizational factors that may be related to commitment, they provide less insight into the causal nature of these relationships.
>
> Unlike job satisfaction, which is viewed as a less stable attitude that may reflect contemporaneous job conditions, commitment is viewed as a more stable attachment to the organization that develops slowly over time. The commitment of employees to organizations is perhaps best characterized as a process that unfolds over time. [Ref. 12:p. 45]

In addition, similar to other constructs, commitment is a complex variable that is difficult to define and measure. [Ref. 13:p. 232]

"The development of commitment may involve the subtle interplay of attitudes and behavior over time...commitment attitudes lead to committing behaviors that reinforce and strengthen attitudes." [Ref. 12:p. 47] Commitment develops in stages, which can be defined as the anticipation (pre-entry) stage, the initiation (early employment) stage, and the entrenchment (career) stage [Ref. 12:p. 46].

It is likely that the commitment process starts prior to an individual formally entering the organization. Pre-employment and job choice influences can affect commitment.

Studies (O'Reilly and Caldwell, 1980; Mowday and McDade, 1979) have found that low intrinsic justification and sacrifices made in choosing a job are associated with higher commitment after the choice is made. Initial commitment to the organization appears to be influenced by personal characteristics of the new hire, job expectations, and the circumstances associated with the decision to join [Ref. 12:p. 54]. However, it "should be recognized that commitment at this stage probably does not represent a very stable attachment...rather (it) may be interpreted in terms of the propensity to develop a longer term commitment." [Ref. 12:p. 55]

The first few months on the job are thought to be very crucial to the development of lasting attitudes and expectations (Hall, 1976) [Ref. 12:p. 55]. This period provides first hand experiences of the job and organization. "Most new employees who leave the organization will actually terminate during the first year on the job (Wanous, 1980)." [Ref. 12:p. 55] There are numerous influences on commitment during this period; which Mowday, Porter, and Steers categorize as personal, organizational, and non-organizational in nature. "Felt responsibility," which is a person's sense of responsibility to the workplace relative to his feelings of responsibility to other aspects of life such as family, friends and leisure, may be the factor through which the various influences work; any factor that reduces felt

responsibility will also reduce commitment. Job characteristics such as scope, autonomy, pay, challenge, and supervision; organizational characteristics such as employee ownership, policies, and dependability; and non-organizational characteristics such as unemployment rates and characteristics of other organizations where job alternatives may lie, all can affect felt responsibility. "For organizations operating in competitive job markets (e.g., engineering) high levels of commitment are most likely to be maintained by providing employees with high levels of extrinsic rewards." [Ref. 12: p. 64]

One of the strongest predictors of commitment is tenure in the organization (entrenchment). This influence is the result of several related factors. Tenure increases the likelihood that more challenging assignments, more autonomy, and higher levels of extrinsic rewards will be bestowed upon an employee. Tenure also increases employee investment in the organization in the form of time, energy, and emotion. Tenure also tends to increase the level of social involvement within the organization and the community, involvements which the employee may hesitate to jeopardize. Firm specific human capital theory suggests that tenure tends to decrease job mobility as employees develop specialized skills that may not be transferable and as job alternatives decrease with age. Finally, tenure may be associated with opportunity costs, such as missed career opportunities or the ability to develop close

family relationships. Most employees have goals and aspirations that conflict with their jobs. An investment in a job or organization may mean that these goals will never be realized, and that personal sacrifices must be made. In order to justify these sacrifices, attitudes towards the organization may become more positive. [Ref. 12:p. 66]

Employee commitment has positive and negative consequences for the individual, the work group, and the organization. At the individual level, commitment is found to reduce likelihood of turnover [Ref. 12:p. 137]. The importance of commitment to an organization may be greatest for those with no family or social relationships outside of work, since it is generally believed that most individuals desire more direction, purpose, and security in their lives (which organizations may provide). However, commitment may also have costs for the individual. Committed individuals may reduce their mobility, as well as opportunities for promotion, self-development, and growth. High levels of commitment to an organization may result in stress and tension in the family and social settings.

> The potential for commitment to an organization to disrupt nonwork relationships may be greatest when the individual's job is highly demanding (e.g., professional positions which may require night and weekend work) and when the individual has family obligations. [Ref. 12:p. 138]

The extent to which group members are committed to the organization may have important implications for group processes and effectiveness. However, high levels of

commitment within a group may also lead to "group think" and reduced creativity. [Ref. 12:p. 141]

At the organizational level, highly committed members are likely to enhance organizational effectiveness, reduce costs for training and recruiting as turnover drops, and make it relatively easy to attract additional employees as the word gets out about the organization.

The consequences of organizational commitment are summarized in Table 5.

Arnold and Feldman [Ref. 28] studied turnover using a model that included individual demographic factors, tenure, cognitive/affective orientation to the position (organizational commitment), job security, perceived availability of alternatives, and intent to quit as explanatory variables for actual turnover. They found that "the variables with the strongest zero order relationship to turnover are intention to search for a new position, tenure in the organization, organizational commitment, job satisfaction, and age." [Ref. 28:p. 356] However, in a multivariate stepwise regression analysis, they found that perceived existence of alternative positions and intent to change organizations failed to contribute additional unique explained variance in the turnover process, but that tenure, job satisfaction, perceived job insecurity, and intent to search for a new position were significant. As a result of their findings, they revised their original model to reflect

TABLE 5

CONSEQUENCES OF ORGANIZATIONAL COMMITMENT

Level of Analysis	Positive	Negative
Individual	Feelings of belonging Security Goals and Goals and direction Positive self-image Organization rewards Attractiveness to other employers	Reduced mobility and career advancement Reduced self-development and growth Family strains/ tension Stress
Work group	Membership stability Group effectiveness Cohesiveness	Groupthink Lower creativity and adaptation Intragroup conflict
Organization effectiveness due to:	Increased effectiveness due to: Individual effort Reduced turnover Reduced absenteeism Reduced tardiness Attractiveness to nonorganization members	Decreased Reduced turnover Reduced absenteeism Lower innovation and and adaptation

Source: [Ref. 12:p. 138]

a relationship whereby age, job satisfaction, and organizational commitment influenced intent to search, and actual turnover was then influenced by job security, tenure, and intent to search.

Kraut [Ref. 29] looked at predicting turnover using employee attitudes and intentions. He found that turnover was

negatively correlated with intent to remain, and that intent to remain in turn was highly correlated with satisfaction with the job itself and the company as a place to work. Teamwork, promotion opportunity, and pay were also significantly related with intent to remain, although to a lesser degree, and pay was found not to be related to satisfaction. The results showed that higher skilled employees were more likely to stay for job satisfaction than for external factors, whereas the reverse was true for lower skilled employees. [Ref. 29:p. 235]

In a review of the relevant literature concerning turnover, Muchinsky and Tuttle found that biodata items "appear to be the best predictors of turnover." [Ref. 14:p. 63] In a review of 150 studies, they found that attitudinal predictors (job satisfaction) and personal factors such as age and family responsibilities are useful predictors of turnover. They also cited the work of Porter and Steers (1973), who "presented a theoretical basis for explaining turnover built upon the notion of met expectations of employees." [Ref. 14:p. 64]

Porter and Steers' research found that "the decision to participate or withdraw may be looked upon as a process of balancing received or potential rewards with desired expectations." [Ref. 30:p. 170] They proposed that if rewards met or exceeded expectations, satisfaction would increase, resulting in increased propensity to participate.

They concluded that "where individuals' expectations by and large remain unsatisfied and where alternative forms of employment exist which promise greater satisfaction, we would expect an increased tendency to leave." [Ref. 30:p. 172]

Hill and Miller [Ref. 31] investigated the effects of the adult development process upon turnover. Noting that turnover is costly, disruptive, and stressful for the individual and the organization, they examined the relationship between job change decision criteria and adult life stage. The adult development model hypothesizes that men go through approximately six stages as they mature. Stage I is an early adult transitional period (age 18-22) in which first steps are taken into the adult world and independence from family is sought. The military and college are two major providers of support, acceptance, and belonging at this stage. Stage II is an adult structure building phase (age 22-28), in which building of a secure base in the adult world, via commitments to adult roles and responsibilities, occurs. Initial occupational and life structures are formed. Stage III is a transitional period (age 28-32). Man begins to find "flaws" in his initial life/occupation structures and acts to remedy them. Career shifts are common. Stages IV-VI involve settling down into the reworked life/occupation structures, roots, seeking stability and security, and fine-tuning the structures.

The model was tested on a sample of 600 males who recently had changed jobs. The results of a survey showed that the following reasons were instrumental in the job change process: opportunity for increased responsibility, more visibility, experience, geographic location, background for enhanced promotability, and promotion potential. Multivariate analysis showed that for stage II men (age 22-28), experience, responsibility, and promotion potential were most important. For stage III men (age 28-32), responsibility, experience, and promotion potential were key. The authors pointed out that their design was limited by the fact that the data were post-decision in nature, causing potential data distortion.

Shikiar and Freudenberg [Ref. 32] examined the moderating effects of alternative employment opportunities on the job dissatisfaction-turnover relationship in an archival study correlating unemployment rates with the results of previous dissatisfaction-turnover studies. They found that dissatisfaction and turnover are more strongly related in periods of high unemployment as compared with periods of low unemployment based upon their review of 26 previous studies [Ref. 32:p. 845]. They assert that "from a labor economics perspective, perhaps the best predictor of labor turnover at the aggregate is the level of business activity." [Ref. 32:p. 846] When business activity increases, more jobs are created, increasing opportunity for alternate employment.

They postulate a "push-pull" model of turnover. The "push" forces are internal in nature and determine dissatisfaction, while the "pull" variables are external to the organization and provide the incentive to leave. Behavioral models tend to favor the "push" of job dissatisfaction as the key to turnover, with opportunity acting as a swinging gate which is more open in periods of higher unemployment than in periods of lower unemployment. Economic models see the "pull" of opportunity as the more dominant force, acting as a magnet, with satisfaction/ dissatisfaction tending to hold or release employees.

Every one of the 26 studies used by Shikiar and Freudenberg showed that job dissatisfaction was positively related to turnover and that there is a positive relationship between unemployment rates and the magnitude of the dissatisfaction-turnover process. Shikiar and Freudenberg also noted that the "pull" of opportunity appeared to be a more dynamic force than one which simply blocks the "push" of dissatisfaction, and that it was not the only force affecting turnover. In fact, voluntary turnover still occurs during periods of low opportunity. When opportunity is low and an employee quits, the reason is likely to be dissatisfaction. However, when opportunity is high and an employee quits, there are likely to be other reasons as well. [Ref. 32:p. 852] Shikiar and Freudenberg did note two possible methodology problems in their study. The first problem was that the

studies which they used were not randomly selected, but were based on availability and ability to meet certain criteria, thus introducing a sampling error. The second problem was with potential measurement error in determining unemployment rates and in the different measurements and research methods used by the different authors in the various studies. The consequence of these problems is a potentially underestimated correlation coefficient, and Shikiar and Freudenberg rightfully caution that generalizations beyond their study should be made with caution [Ref. 32:p. 852].

While understanding the determinants of turnover is important, the consequences of turnover are equally important. Several studies [Refs. 16,33,34] have investigated this phenomenon at various levels: individual, work group, and organization.

The consequences of turnover are as important as the consequences of commitment. At the individual level, stayers and leavers are affected in different ways. These effects are summarized in Table 6.

The effects of turnover on work groups has received less extensive consideration than individual and organizational effects. Positive consequences include new ideas, enhanced creativity, added skills, reduced conflict, and enanced cohesiveness as possibilities. Negative possibilities include increased conflict, reduced cohesion, increased workload for stayers, and increased effort and time needed to

TABLE 6

CONSEQUENCES OF TURNOVER FOR INDIVIDUALS

Level of Analysis	Positive	Negative
Leavers	Increased earnings Career advancement Improved individual job match Increased challenge Self-development Nonwork benefits (e.g., location) Increased family ties New social relationships Enhanced commitment to new job and organization	Loss of seniority Loss of nonvested benefits Unreimbursed moving costs Disruption of family Transition stress Loss of friendships Decreased family ties
Stayers	Opportunities for promotion More positive job attitudes Increased performance Stimulation at work Initiation of search that results in better job	Increased workload Decreased performance Stress and uncertainty Less positive job attitudes Loss of friendships

Source: [Ref. 12:p. 144]

socialize and train new members [Ref. 12:p. 157]. Mueller and Price [Ref. 33] studied 115 work units in five organizations and determined that turnover had a negative effect on organizational communication and behavioral commitment of those who remained, but it had no effect on job satisfaction. They noted that one problem with their study was determining the true span of interest for the study.

At the organizational level, turnover may be functional or dysfunctional. The consequences are summarized in Table 7.

TABLE 7

CONSEQUENCES OF TURNOVER FOR ORGANIZATIONS

Positive	Negative
Innovation and adaptation	Costs of turnover:
Increased employee morale and mobility	Selection and recruitment
Increased motivation	Training and development
Increased effectiveness	Administrative staff
Reduction in entrenched conflict	Demoralization of employees
	Negative public relations
	Operational disruption
	Decreased effectiveness
	Structural changes
	Formalization
	Centralization
	Decreased employee social involvement at work

Source: [Ref. 12:p. 154]

Johnston and Futrell [Ref. 34] viewed the turnover process and its effects as being possibly beneficial to an organization. They also question the prevailing notion that turnover is inherently a negative function. Some people are detriments to their organizations, and they support the contention that managers may spend time more wisely by attempting to retain high quality people, rather than by worrying about across the board retention.

Their study used a number of variables that have been shown to be possible antecedents of turnover frequency: role stress, job satisfaction, leadership behavior, propensity to leave (intention), and salary. The study attempted to

determine if these variables applied to functional turnover as well. Johnston and Futrell assert that the effects of turnover are exaggerated in the negative direction because not all individuals who quit are of equal use to the organization. Those who voluntarily leave, but would have been retained by the organization, have a larger negative impact upon the organization when they leave than do those who leave and would have been let go by the organization anyway.

Over 100 college-graduate entry level salesmen were surveyed. The results showed that traditional measures of turnover exaggerate the turnover problem. Over half of the turnover experienced was actually functional, i.e., beneficial, for the organization and involved undesirable people leaving. Only two variables were found to be significant predictors of functional turnover: salary and leadership behavior. This showed that higher salaries and greater role and expectation clarification by management leads to increased likelihood that high performers will stay. In addition, propensity to leave was found to be a significant predictor of turnover frequency. [Ref. 34]

As can be seen from the above summary of studies, the turnover process in the civilian sector can be modeled in a number of ways, and it is the subject of a substantial amount of research. However the civilian sector is not unique in this respect, as will be shown in the following section which focuses on turnover in the military.

C. FOCUS ON THE FEDERAL GOVERNMENT

1. Military

Many factors are influencing the Navy's ability to obtain and retain a sufficient number of high quality people to carry out the wide variety of missions it is assigned. Managers and manpower analysts are becoming increasingly concerned about the Navy's ability to man important functions with people who have the necessary abilities [Ref. 35:p. 2]. Specific problems seen include shortages of skilled workers, since "high technology companies will continue to grow and they will be drawing a greater portion of the labor market from which the Navy draws," federal civilian ceilings, and a general decline in the number of people interested in careers in civil service [Ref. 35:p. 8].

Some of the original work by Porter and Steers (1973) [Ref. 30] studied 534 National Guardsmen, looking at job satisfaction and organizational commitment. It found that each satisfaction variable tested; such as work, promotion opportunity, pay, co-workers, supervision, and organization satisfaction, was significantly ($p < .05$) correlated with intent to remain in the organization. Organizational commitment was also significantly ($p < .05$) correlated with intention. Intention to remain was highly correlated with the act of remaining ($r = .67$, $p < .05$). However, these results failed to support Porter's hypothesis that dissatisfaction

with the organization did not necessarily equate to job dissatisfaction. [Ref. 30]

Hom et al. [Ref. 10], in a study funded by the Office of Naval Research, tested three approaches to the turnover process; Fishbein's intention model, job satisfaction (measured with the Job Descriptive Index), and Porter's organizational commitment model (with commitment measured using Porter's Organizational commitment scale). Using a sample of 252 National Guardsmen, all three models were found to accurately predict turnover behavior, with intentions (Fishbein) showing a multiple correlation of .65, commitment (Porter) showing a .58 correlation, and satisfaction showing a .55 correlation (all at $p < .05$).

Hom et al. stated that the relationship between job satisfaction and turnover is seldom strong, with correlation generally less than .40. This may be due in part to the idea that a leaver may be as satisfied with the job as stayers are, but may <u>still</u> leave for a more attractive alternative. In addition, the high correlations found for this study may be due in part to the sample used. National Guardsmen, like all military people, must make their leave/stay decision at a particular point in time (end of obligation). Civilian employees are not expected to have to make such a clear and specific decision. They may intend to quit but may be uncertain when. Consequently, the military member's decision to quit may carry greater commitment than it might in the

civilian sector, because it must be more thoughtfully and carefully considered [Ref. 10:p. 287]. A weakness in the study is that it deals with National Guardsmen, which are part time military employees. As a result, the results of this study may not be transferrable for direct application to an active duty military sample.

Vernez and Zellman [Ref. 36] looked at the importance of family factors on turnover among Army personnel. Their model proposed that the family (and not the individual member) should be the basic unit of interest, since a job related decision made by the member is influenced by and affects the entire family. Family factors, such as the member's and spouse's age and skills, employment situations, and dependents status interact with military and external environmental factors. This interaction causes perceptions and intentions within the member and the family, including satisfaction with the military, turnover intentions, and perceptions of the value of civilian alternatives. These perceptions and intentions then result in outcomes, such as performance, family cohesion, and possibly, turnover. Vernez and Zellman conclude that,

> ...it is not sufficient to know whether military members and their families are satisfied or dissatisfied with (military) life; it is also necessary to know their level of satisfaction (as it) compared with the level of satisfaction which they think would be available to them in the civilian sector. [Ref. 36:p. 17]

Using the same methodology, officers in the United States Navy listed the following reasons for leaving the service: compensation (27%), family-related (22%), job-related (22%), military benefits (15%), and others (14%). These results demonstrated the importance of family factors on turnover. In addition, the study found that family factors increased in importance as length of service increased, people tended to remain in the service if they had good peer relations, high work satisfaction, and supervisor support, and "for officers, job satisfaction correlated with career intent." [Ref. 36:p. 35]

Stated career intent was found to be the strongest predictor of Navy officer retention [Ref. 37] in a study of the Naval aviation community. This study found that spouse support, job challenge, career satisfaction, and organizational commitment account for half the variance in stated career intent. Level of promotability was also a significant ($p < .05$) correlate of retention. This positive relationship between promotability and retention could be used as a tool for planners, since highly rated officers perceive their career opportunities as being good and stay, while lower rated officers might be more likely to leave.

Other results of the study found that the effects of job challenge, career satisfaction, and commitment on retention were indirect, acting through career intent. Support of spouse had a direct and indirect effect on

retention. Specifically, sea duty and family separation did not affect actual retention behavior, since spouse support was found to provide a buffer for the negative effects of family separation on career intent. [Ref. 37]

> It should be noted that in the determination of career intent, organizational commitment and career satisfaction were less important than either spousal support or job challenge. These findings caution against undue reliance on satisfaction and commitment measures as sole indicators of career intent. [Ref. 37:p. 14]

Another weakness of this study is that it only involves one specific warfare community, therefore, the findings may have little Navy-wide relevance.

It has also been found that marital status and family status are key non-pecuniary factors affecting the turnover decision. There are two hypotheses concerning the possible effects of these factors. The first hypothesis claims that marriage or increased numbers of dependents increases turnover due to separations and moves. The second hypothesis claims that marriage and dependents decreases turnover due to medical benefits and job security aspects. [Ref. 38]

Another study [Ref. 15] found that,

> ...there is a clear correlation between job satisfaction and quit behavior. The factors that contribute to job satisfaction are the same as those previously claimed to influence quit behavior: pay, working conditions, job security, advancement opportunity, dispute resolution mechanisms, and psychological rewards. [Ref. 15:pp. 35-6]

In the case of the Navy, there are unique rewards available: the ability to play with some of the world's most expensive and exotic toys, opportunity for travel, possibly exciting

work, and camaraderie with shipmates are important to some individuals. The responsibility that the military requires its members to take at early stages in their careers may be largely unmatched in the private sector. The training provided is important to almost everyone [Ref. 38:p. 11].

Research regarding pay has shown that,

> ...in addition to it's inflexibility, the military compensation system is notable for its lack of incentive for advancement and better job performance....That private sector employers, who face fewer constraints than the military, choose to establish much larger pay differentials by grade level, is revealing. [Ref. 39:p. 44]

This is especially important, since "the Navy manpower system is a market with supply and demand. Compensation and personnel policies are the mechanisms which equilibrate the supply and demand sides of the market." [Ref. 39:p. 2] This same study concludes:

> The military personnel system has many distinctive features. First, many policies are geared toward maintaining discipline and esprit de corps. The need...derives from the fact that the military mission is quite unlike any in the private sector. Second, it is a closed system. The services take very few lateral entries. The military operates an up-or-out promotion system designed to enhance job performance and eliminate non-performers. [Ref. 39:p. 52-4]

Doering and Grissner [Ref. 40] proposed a life cycle model of military participation. Motivation, morale, performance, and satisfaction can be improved by either changing the type of individual in a job, or by changing the job or environment. The type of individual in the organization results from organizational policy choices

concerning such issues as pay and benefits. People choose military or civilian jobs based on comparisons of pay, benefits, and non-monetary compensation aspects such as housing quality and work conditions. Once the initial career path has been chosen, the decision to remain with that choice will be based on further comparisons and the organization's ability to meet the individual's needs. Too much organizational reliance on one organizational aspect, such as pay, may erode the presence of other desirable characteristics such as loyalty and cohesion. [Ref. 41:p. 16]

A study conducted to assess the factors influencing career orientation of junior officers in the Army [Ref. 42] determined that turnover can cause serious personnel management problems, inefficiency and waste of limited resources due to the need for increased officer recruiting and training budgets, and reduced selectability on who to target for retention, all of which lower overall force quality. Factors affecting turnover, and thus career orientation, were of two general types: extrinsic, or environmental factors, such as pay, duty assignments, and fringes; and intrinsic, or need based, such as pride, challenge, and satisfaction. These factors were found to be flexible in nature, changing as economic conditions or tastes changed. Satisfaction with military life was found to be the major influence on career intent for lieutenants with less than four years of service, independent of occupational specialty. Hayden [Ref. 42] noted

that while this is interesting, it does not explain "why" satisfaction or dissatisfaction occurs, and how it can be altered to benefit the military.

A similar study was conducted to evaluate the retention factors for nuclear power trained Navy officers [Ref. 43]. It noted that there is a serious shortage of middle grade, experienced nuclear trained officers, currently about 500 [Ref. 44], and that this could have a critical impact on the nation's defense posture because approximately 40% of the U.S. nuclear deterrent is submarine-borne, and the officers who man these submarines must be trained as nuclear power engineers. Hearings conducted before Congress in 1976 revealed that the factors contributing to separation of mid-level nuclear trained officers, in order of importance, were disparity of compensation for work performed and hours required, family separations due to deployment cycles, excessive workload, and perceived private sector advantages, especially concerning benefits. Admiral Rickover testified that poor retention leads to further problems for those officers choosing to remain on active duty. He was particularly concerned that those who remained were being forced to endure more sea time, which would end up causing more to leave, in an ever tightening spiral. [Ref. 43]

Dickens [Ref. 45] found that while there was a healthy supply of new recruits into the submarine force, and should be until at least the early 1990's, the supply would need to be

increased to cover attrition at the O-4 and O-5 grade levels, where severe shortages exist. A result of such shortages is that "officers assigned to nuclear power tend to get promoted to the middle grades faster." [Ref. 3:p. 66]

The ability to satisfy this need for increased recruitment may not be possible in light of the tight labor market for college graduates, especially those with engineering degrees that are favored by the nuclear and surface warfare communities. It is estimated that in 1990 there will be about 58,000 male engineering degree graduates, and in 1995 only 52,200, as compared with 64,000 in 1986 and 56,400 in 1981 [Ref. 45]. The submarine force has failed to meet recruiting goals in a period of increasing college graduates (pre 1986), indicating little doubt that this problem will escalate as graduate rates decrease and competition for those will increase. This underscores the need for increased retention.

In a study dealing strictly with officers holding degrees in various engineering disciplines, Bowman [Ref. 46] found:

> Retention beyond the initial period of obligation is generally not related to a grade, academic major or achievement in technical or non-technical courses. This suggests retention decisions are based on personal characteristics, the quality of work experience encountered during one's first tour, and monetary options perceived near the end of one's obligation. [Ref. 46:p. 15]

In its own models for estimating officer retention patterns, the DOD considers several factors to be important.

A dynamic retention model for Air Force officers [Ref. 47] accounts for the effects of, and interactions between, promotion opportunity, compensation, and retirement policies. The model assumes that retention rates will increase with seniority, even with a constant incentive package, due to a self-selection phenomenon, and that each officer differs in taste and non-pecuniary returns derived from military life. Other models used by DOD, such as the Structured Accession Planning System-Officer (STRAPO), the Officer Retention Forecasting Model (ORFM), the Officer Force Projection Model (ORPO), and the Annualized Cost of Leaving Model (ACOL), recognize the importance of compensation [Ref. 48] and perceived differences between employment alternatives [Ref. 49] to the turnover process. The ORPO model [Ref. 50] shows that O-3/4 level officers are more vulnerable to pay changes than are O-5/6's, due in part to seniority and cost of leaving [Ref. 51] issues. The basic assumption in the ACOL approach is that the individual decides whether or not to remain in the service based on the perceived costs and benefits of the alternatives, and that all decisions are made within a utility maximization framework, where utility is based on monetary and "taste" components [Ref. 51:p. 24].

> Taste for military service may play an important role in the (turnover) decision. Some people derive positive benefits just by being in the military. Perhaps it's the job security, the challenge, the structure, the travel, patriotism, or a combination of these factors that makes military service more attractive than civilian employment. Others view military service in negative terms:

regimentation, danger, lack of individual choice. [Ref. 51:p. 25]

All of the models realize that losses affect not only total end strengths, but grade and community distributions, promotion opportunities and selectability, and recruiting and training costs as well. However, use of these models may be problematic, due to the fact that the ability to accurately project future earnings streams is difficult at best, and they avoid the fact that individuals may weight earnings in different years in different ways. Also, as mentioned above, self-selection, particularly as individuals age, can bias the findings away from earnings factors and more toward "taste" factors.

Eitelberg [Ref. 3] quotes N.P. Snyder, who states that "by emphasizing technical qualifications and academic program-career matching, the services have adopted many of the recruiting perspectives of large-scale nonmilitary organizations." [Ref. 3:p. 33] The Gates Commission felt that "while it is important to continue to attract college-graduate officers, the decision to staff the officer corps almost entirely with college graduates was somewhat arbitrary." [Ref. 3:p. 80] Steady growth in college enrollment and the number of graduates has helped officer recruitment in the past. However, this base is expected to decline in the 1990's.

Robertson and Ross (1979) found in a study of military retention that commissioning source, major, and experiences during initial assignment were important determinants of career orientation. Holzbach (1979) found relationships between the first two tours of duty and retention, with emphasis on expectations regarding future assignment, the amount of sea duty and perceived amount of family separation. [Ref. 52]

Schmidt [Ref. 53] included intrinsic and extrinsic satisfaction variables, as well as age, commissioning source, family benefits and security, and economic variables for pay expectations and spouses earnings in his multivariate retention model. He also concluded that satisfaction was heavily influenced by expectations concerning benefits. Ashcraft [Ref. 52] updated the Schmidt model, including biodemographic, tenure/time-related, cognitive/affective orientation, perception of external job opportunities, and family financial resources as the explanatory variable categories in his model.

A study by Christensen (1983), cited by Ashcraft [Ref. 52], found that perceptions that the family would be better off with the member in a civilian job, satisfaction with military life, and feelings about current job location were significant factors for predicting enlisted reenlistment behavior.

Recent research dealing with satisfaction with military life by Cavin [Refs. 54,55] shows that satisfaction and dissatisfaction with military life are opposites with respect to certain key variables, or in other words, they can be caused by attitudes regarding the same variables and can be measured on the same scale within certain limitations [Ref. 54]. In another study [Ref. 55], he finds that based upon the 1985 DOD Survey of Officer and Enlisted Personnel, military satisfaction should be measured using three variables: personal fulfillment, family stability, and military fringe benefits. He uses the technique of Factor Analysis to derive these variables and advocates their use over any individual measure of satisfaction that might be constructed, so as to separate individual effects of each aspect of the satisfaction concept.

The work of Derr [Refs. 56,57] focused on career concepts. He viewed the career:

> ...as a sequence of work-related experiences which comprise a work history and which reflect a chosen work-related life theme. Thus the career is seen as long-term. It comprises more life space than a job but it is not all of life. And it demands individual choices in reference to a cognitive map about the dynamic interaction of work, self, family, and external social forces. This is so even if the person decides to do nothing. [Ref. 56: p. 1]

In a study concerning the reasons for "career switching" and the factors affecting the decision to quit one "career" in favor of another, Derr [Ref. 57] cited three basic reasons for opting for another career. The first of these was

age. Citing the work of Hall (1976) and Clopton (1973), he identified "two periods of restlessness in one's personal life development: the identity period when one is seeking his niche (ages 28-32) and the mid-life crisis (ages 40-48)." [Ref. 57:p. 2] These two periods in one's life were periods of growth and transition, and therefore, more subject to career transitions involving turnover.

The second reason involved individual personality traits. Citing the work of Driver (1977) and Laserson (1973), Derr proposed that certain types of people, particularly those who possessed "in reserve" resources and personal security, and those who became easily bored and looked for new challenges, were more apt to change careers. And finally, those persons with sufficient financial security to see them through a period of transition were identified as more likely to make a career change. [Ref. 57:p. 4] Derr also cited the work of Schein (1978), who noted that each person's pursuit of a certain kind of career is a function of basic values, motives, needs, and talents which act as "career anchors," influencing a person's decision to change occupations. [Ref. 58:p. 5] Schein's research showed that the early career (1-5 years) was a period of mutual study and discovery between employee and employer. Between the fifth and tenth year, approximately, one gains a clearer occupational self-concept. Schein labeled this self-knowledge the "career anchor." [Ref. 59:p. 6]

"The career can be said to be anchored over time in the set of needs or motives which the individual continuously attempts to fulfill through work and the rewards obtained through work." [Ref. 58:p. 5] The five primary anchors discovered by Schein were:

> ...(1) need for autonomy or independence at work, (2) need for job security, (3) need for technical functional competence, (4) need for managerial experience, and (5) need for exercising creativity on the job. These values tend to hold constant during much of the work life irregardless of a particular switch in actual work assignments or place of employment. [Ref. 56:p. 4]

Derr expanded upon Schein's work in this area by attempting to apply the "career anchor" concept in a study of Naval officers, in which he found that over 70 percent of the officers surveyed possessed a technical or managerial anchor. Fifteen percent possessed a security anchor. [Ref. 59:p. 8] Derr also noted large differences in anchor characteristics across warfare specialty communities.

The implication of Derr's work is that officers with autonomy and creativity anchors, being in the minority, are less likely to remain on active duty and therefore, the Navy should pursue policies that promote the career development of those officers possessing technical, managerial, and security anchors. Derr even goes so far as to recommend:

> ...that the Navy not attempt to attract or spend resources on career development for persons with creativity and autonomy career anchors. In fact, it may make some attempt to deter these persons and discourage their longtime association with the Navy. [Ref. 59: p. 24]

In a later study of the same sample of Naval officers, Derr [Ref. 60] differentiated several additional anchors that emerged and that he considered necessary to accurately delineate the types of career-anchor profiles uncovered in the study. These additional anchors were "the upwardly mobile manager, evolutionary manager,...identity-affiliation,... growth-oriented creativity, entrepreneurial creativity, and warrior." [Ref. 60:p. 29] He also identified the "plastic man," which he described as "a person who arranges his life around whatever job options become available." [Ref. 60:p. 30] Derr suspected that this type of person possessed no dominating abilities-based or needs-based anchors, and possibly delayed his career-anchor patterning.

In the military, retention/turnover is thought of as a performance measure, although it is more accurately tied to career behavior instead. Manpower analysts use it to measure "performance" since it shows the long term return on military investment in personnel training [Ref. 3:p. 68]. Retention can also show the extent of the individual-military "fit" (which is deemed to be an important determinant of retention), assuming that people remain in the military because the "employer" perceives them to be good performers and desires to retain them, and that the individual himself desires to stay [Ref. 3].

Retention rates may vary across occupational specialty for several reasons. Level of training provided, programmed

turnover within communities (such as up-or-out promotion policies), job market factors, quality of life, job satisfaction, and economic incentives all have a role in determining turnover. Within the Navy, 18.1% of the officer corps leaves the service within four years of commissioning, and the average length of service for all officers is 95.5 months (or seven years) [Ref. 3:p. 70].

The services themselves point out that there are advantages and disadvantages to serving in the officer corps. Among the listed advantages are responsibility and leadership opportunity, advanced education and training, excellent pay and benefits, travel, opportunities to gain personnel and management experience, outstanding job security, and promotion opportunity. On the negative side are listed frequent moves, family separations, hazardous work conditions, long work hours, and potential non-availability of preferred assignments [Ref. 3:pp. 124-5]. The GAO comments that military officers don't have a "regular" type of job: they must place the organization's needs above their own and their families', must work under the constraint of unlimited liability, and they must give up certain rights and freedoms of action found in civilian employment. Military officers are public servants who are often called upon to sacrifice their quality of life for their country [Ref 3:p. 128].

2. Federal Civilians

The body of research on federal civilian engineers is limited, however planning models used for DOD scientific and engineering personnel are similar to those used for officer communities. Navy managers within the Research and Development community are concerned with retaining qualified engineers. A study by the Naval Personnel Research and Development Center [Ref. 61] noted that constraints placed upon the DOD civilian organization by Congress set limits for high grade end strengths and reduced promotion rates to GS-13 from 1978-1980, causing a loss of skilled people at the GS-12 level, and at lower levels as well, since personnel perceived their career paths and promotion opportunities to be unattractive. The impacts of these constraints are thought to have a long term debilitating effect on the Navy R&D establishment, and perhaps could contribute to the professional demise of these organizations.

Another Naval Personnel Research and Development Center study [Ref. 41] conducted at the Naval Material Command analyzed how attitudes and perceptions held by civilian engineers in a Navy industrial setting affected their turnover intentions. Navy managers reported that while they were able to hire newly graduated engineering students; attracting experienced engineers, even in a recession, was impossible. In addition, they stated that qualified experienced engineers were leaving for better paying private sector jobs. "The Navy

hires inexperienced, engineering graduates; provides them with valuable experience; and then loses them to the private sector." [Ref. 41:p. 1]

The study surveyed 132 engineers of various types. Thirty-four factor based scales were used to determine attitudes. These scales were distributed as follows: general attitudes (5), job facets (5), task/role characteristics (8), work group functioning (3), supervisory behavior (4), pay (4), organizational characteristics (3), and workspace characteristics (2). These factors were then analyzed to create five composite scales: intrinsic job satisfaction, supervision, interpersonal climate, organizational climate, and material satisfaction. The composites were then used to predict turnover intentions.

The research revealed that engineers, in general, desire four aspects to be present on their jobs: challenging work, competitive and equitable compensation, merit-based promotion opportunity, and fair supervision. Those leaving government service cited as the major reasons for leaving the lack of opportunity to do important and interesting work, inadequate compensation, and poor advancement opportunities [Ref. 41:p. viii]. The best predictors of turnover for engineers were found to be attitude towards supervision and overall level of material satisfaction, followed by intrinsic job satisfaction, organizational climate, and interpersonal climate. [Ref. 41]

Quality of supervision has a large and positive impact on turnover because supervisors have an impact on promotions and bonuses, can assign varied, interesting, and important work, and can cut through the red tape which can block productivity and creativity. Level of material satisfaction was based on competitive and fair pay, which is often difficult to determine for engineers, since responsibilities and standards of performance relating to engineering positions are less readily measured, relative job worth is not so easily determined, and promotion rationale is not so easily developed as compared with more rigidly defined jobs [Ref. 41]. Intrinsic job factors were found to be very important to engineers, who are usually dissatisfied with them due to perceived lack of challenge, unimportance of the job, lack of autonomy and control of work pace, unfair workload, and excessive requirements for job coordination. Although a weakness of the study is that it uses a self-selected sample of federally employed engineers, making direct comparisons to the private sector questionable, the findings are congruent with the attitudes historically expressed by engineers, who traditionally express chronic frustration and dissatisfaction with their jobs, and perceptions that their jobs are unimportant, lack challenge and lack autonomy.

> Traditionally, government scientists and engineers have listed two major reasons for quitting: eighty percent cited opportunities to do important and interesting work in an environment of freedom and individual responsibility, while

60 percent cited inadequate compensation and lack of opportunity for advancement. [Ref. 41:p. 10]

D. CONCLUSION

Turnover is a complex subject. To say that the decision to stay or leave a particular workplace can be explained or predicted by the relationship between one or two variables is simply avoiding evidence that states otherwise. The literature supports the contention that turnover is related to age (or tenure), demographic, economic, satisfaction, and commitment factors, as well as expectations concerning alternative employment and certain aspects of one's current job. In addition, it appears that the decision is not truly an individual one, since the perceptions of family members (or significant others), and peers, can influence the process. This further complicates the picture, since it is difficult to model or measure the effects of such influences.

The majority of the research surrounding civilian turnover focuses on the relationship between satisfaction or commitment and turnover, as moderated by tenure, phase of life, or economic conditions. Little mention is made regarding the influence of biographical factors such as marriage or number of dependents. However these factors are seen as very important in the studies regarding military turnover. It is likely that these factors do influence the civilian turnover decision, although it may be to a lesser extent due to the additional impositions created by extended military

separations, frequent moves, and strict reliance upon military institutions for compensatory benefits, such as medical care and commissary privileges. Due to these factors, a strong argument could be made that the military is more than just a job, it is a way of life; particularly for married officers. In fact, the Navy has found,

> For both officers and enlisted, the decision to leave or stay may ultimately hinge on the member's perceived quality of life. In addition, today it is often difficult to draw the line between individuals and their families in any personnel decision. [Ref. 62:p. 28]

In contrast, civilians are generally not likely to be subject to the same type of constraints when it comes to family stability and benefits, and one would think, are able to exhibit more freedom in the job market. Their skills are more readily transferrable from job to job, and they are more able to tap regional labor markets for employment, whereas naval officers are assigned based upon "the needs of the Navy." From a purely economic standpoint, this allows the married civilian the opportunity for his spouse to gain long term employment, thus improving family earnings flow as well as level of financial security. This effect has been shown to influence the turnover decision [Ref. 56].

The turnover decision then, is similar for civilians and military officers, however; there are differences in the magnitude of the various factors that affect it. Based upon the literature, these factors can be modeled against intent to remain with the organization, and then using correlations

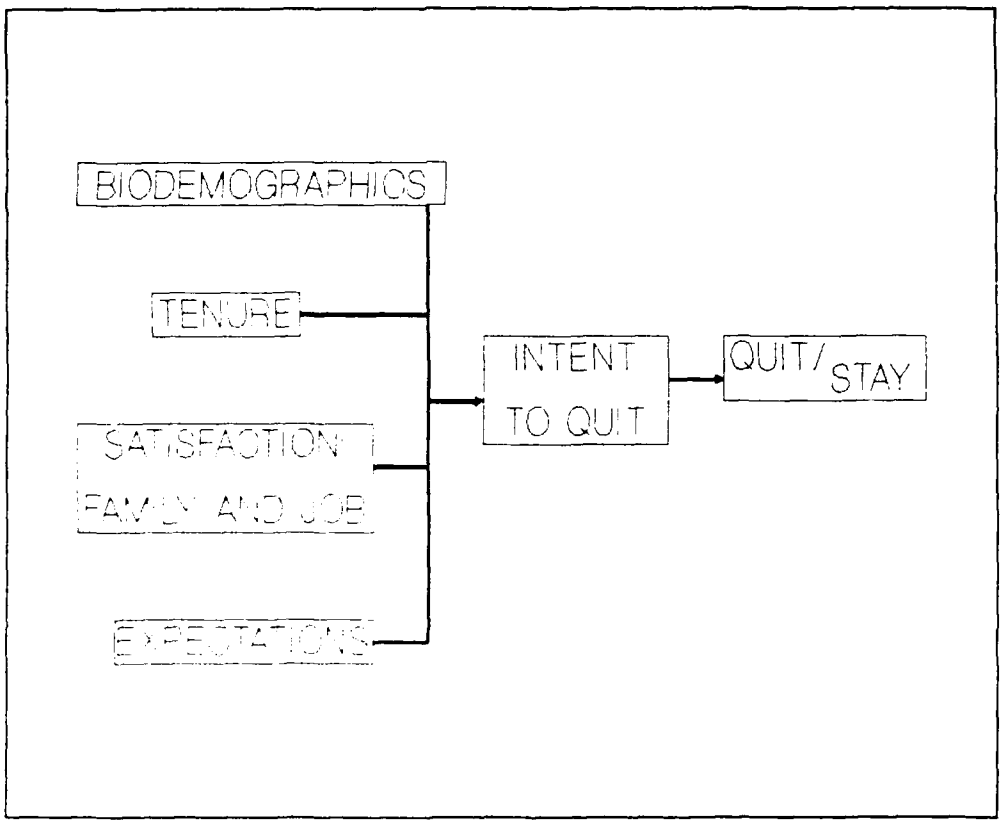
and multivariate regressive techniques, the magnitudes can be determined. The subsequent analysis of results can then be used to help predict as well as compare the differences in turnover between samples, provided the measurement of the factors is consistent. The following chapters will discuss this methodology, and then apply it to two separate samples in order to study the career intent and the factors affecting those samples.

III. METHODOLOGY

Several studies have noted direct relationships between stated intention to quit and turnover behavior. Based upon this research, this thesis assumes that career intention is closely related to turnover behavior and uses it as a proxy for actual turnover. Additional studies addressed above have identified various economic, satisfaction, and biodemographic factors that influence the turnover process. Based upon the studies of turnover summarized in the literature, the turnover process can be depicted as a decision based upon several factors, as shown in Figure 1. The process involves consideration of most, if not all of these factors, however the magnitude of the effects will vary between individuals. The model depicted in Figure 1 considers the various factors which have been shown to influence the individual turnover decision. In addition to demographic, tenure, and pure job satisfaction measures, measures of satisfaction with certain aspects of family environment, and expectations regarding the military and job alternatives are included.

It was felt that job satisfaction was too narrow a construct to use as the sole satisfaction-related variable explaining turnover, particularly in terms of military personnel, since the job itself has such an impact on the way of life. Therefore, inclusion of some measure of family

satisfaction or well-being was included as a factor affecting the turnover decision process. Expectations regarding transfers, promotions, and alternative employment opportunities have been correlated to turnover in previous studies, and they are included in the model as well.



Source: Authors

Figure 1. Hypothesized Turnover Model

Inclusion of these factors is consistent with the model proposed by Ashcraft [Ref. 52], which relates career

orientation to tenure, perception of civilian job opportunities, cognitive affective orientation (satisfaction), family financial resources, and biodemographic factors. In fact, the model used for this analysis includes factors similar to those in both the Ashcraft and Schmidt [Ref. 53] models. However, it avoids the "economic" well-being factor associated with family financial resources, since the research [Ref. 24] indicates that economic effects have minimal impact on the turnover decision process. In addition, it is not a major cause of dissatisfaction among leavers from the military (and in fact appears as a satisfier to those remaining in the military).

The model's key difference from previous attempts to explain the turnover decision is that it includes separate variables for expectations about transfers and promotions, specifically: how the respondent feels about his expectations regarding assignment to a "good" duty station for his next tour of duty, and what he thinks his chances are for promotion to the next paygrade. It is felt that these factors significantly influence the intention to search for a new job, particularly in the case of personnel that are approaching the window for promotion or reassignment, and are consciously involved in the turnover decision process (at the point where costs of leaving are weighed against benefits of staying). It is recognized that these variables may be unique to the military community, however it is expected that this will be

one of the major differences between the military and civilian samples under consideration. This is particularly true with respect to the variable regarding next duty station.

The data for the analysis of military officers comes from the 1985 DOD Survey of Officer and Enlisted Personnel. This survey is broken into nine sections, each dealing with a specific general area of interest. Topic areas included Military Information, Past and Present Locations, Career Intent, Individual and Family Characteristics, Dependents, Military Compensation and Benefits, Civilian Labor Force Experience and Family Resources, and Military Life. The questions attempted to measure relevance to the respondents and their satisfaction with various aspects of military service. The particular data set used in this analysis was reduced to include all male U.S. Navy Officers with submarine or surface warfare designators, with length of service between four and 12 years.

The data were sanitized by dropping those responses with missing values (which cut the sample size by six respondents). Officers with greater than 12 years of service were deleted, since it is felt that any officer past this point has an extremely high probability of staying for 20 years. Only those officers serving beyond their initial obligation were retained in the sample as well, since the study is only interested in voluntary career choice behavior.

In order to study projected turnover and its determinants at the Naval Avionics Center, a survey was administered to a representative sample of the population. (A copy of the survey is provided as Appendix B.) The survey was developed using the 1985 DOD Survey of Officer and Enlisted Personnel and the Naval Personnel Research and Development study Prediction of Turnover Intentions Among Civilian Engineers Employed at Navy Industrial Facilities [Ref. 41] as a basis for constructing questions to measure those factors deemed relevant by the literature. In most cases the questions were taken word for word from the references, however, there were some questions that were reworded so that references to the military were avoided. Another difference in the survey developed for administration at the Center is that in all questions requiring scaled answers, the respondents used a five point or seven point Likert type scale for their response. The DOD Survey used five point, seven point, and ten point scales, which often seemed confusing. In the interest of ease and consistency, as well as the absence of any requirement for finer measurement in the responses, the five and seven point scales were used throughout the survey. In addition, in order to ensure consistent answers, some questions were asked in two different ways. The answers were checked for consistency and no deviations were found.

The survey sample was chosen by the staff at the Naval Avionics Center. The only requirement asked of the Center was

that respondents possess at least two and not more than 14 years of federal service at the Center, and that the sample be selected randomly, and representative of the distribution of engineers and scientists at the Center. The Center attempted this by first determining the number of engineers and scientists in each department, and then proportionally allocating 200 surveys throughout the organization. The result was a stratified random sample. The surveys were administered through representatives in each department, and collected either by the researchers on the site or by the personnel office. The survey was completely confidential. No identifying marks were requested or used, and to ensure confidentiality, the respondents were provided with a large manila envelope and asked to return the survey inside the sealed envelope.

Of the 200 surveys disseminated, 167 were returned, which equates to a response rate of 83.5 percent. The survey was administered to female respondents for future research purposes, however their responses were deleted for the purposes of this analysis. In addition, three surveys were inadvertently administered to personnel with lengths of service outside the relevant range, and their responses were also dropped. Responses were manually entered into a computer database for analysis, using essentially the same variable titles assigned to the military sample data, except as noted below.

A. PRELIMINARY ANALYSIS FOR MILITARY SAMPLES

Based upon the review of literature and existing research, the following factors were considered as candidate variables for use in determining the correlates of turnover:

- marital status
- number of dependents
- education
- years of service
- age
- agreement with spouse on career intention
- satisfaction with various aspects of the military and military life
- spouse employment
- whether military life was as expected
- morale level at current duty station
- expectations regarding next duty station
- expectations regarding promotion
- civilian job prospects
- satisfaction with pay and benefits
- career intentions.

These factors were then associated with corresponding questions from the DOD Survey in order to construct variables for use in correlation and regression analysis. The underlying theory of this study is that career intentions, serving as a proxy for "career orientation" or commitment behavior, are a function of these "explanatory" variables.

Once the determination is made regarding which variables are correlated to turnover, they can be used in a multivariate model in an attempt to estimate the effects of these variables on the turnover process.

1. Varible Construction

Biodemographic variables were taken from the following survey variables as outlined in Table 8. Theoretical expectations were that the presence of both wife and dependents will positively influence propensity to stay, as

TABLE 8

BIODEMOGRAPHIC VARIABLES

Variable name	Survey variable
MARRIED	Present marital state (O51E48)
DEP	Number of Dependents (O67E64)
CURRED	Present Degree Held (O46)
WIFEWORK	Spouse Employment (O97E93A-M)
JOBOFFER	Job Offer Past Year (O94E90)
JOBLOOK	Job Look Past Year (O95E91)

Source: Authors

will any postgraduate education (particularly since postgraduate education acquired through a Navy program requires some repayment in the form of additional obligated service). Whether or not the spouse is employed influences the amount of financial security, removing one of the impediments to quitting the current job, and contributing

toward the decision to quit. The question "Job Offer Past Year" (O94E90) asked whether the respondent had received a job offer in the past year. The question "Job Look Past Year" (O95E91) asked whether the respondent had sought a civilian job in the past year. These last two questions were the basis for the variables JOBOFFER and JOBLOOK. It is expected that these will be negatively correlated to intent to stay, since they may influence the decision process by providing a more secure outlook to someone on the verge of leaving. All of the above variables were coded as dummy variables, with single, no dependents, no postgraduate degree, no job offers and has not looked for a job in the past year as the base case.

Tenure Variables were taken from the DOD Survey as listed in Table 9. Both tenure variables are continuous and expectations are that they will be positively correlated with intent to stay. However, they should also be highly correlated with each other, since the majority of military officers are hired at approximately the same age.

TABLE 9

TENURE VARIABLES

Variable name	Survey variable
LOS	Total Mos. Active Duty/12 (O6E6)
AGE	Age (O36E35)

Source: Authors

Satisfaction variables were created in a similar manner and are listed in Table 10. Two DOD Survey questions were used that measured satisfaction with certain aspects associated with family life. A question regarding satisfaction with family environment was used, as was a question measuring agreement with spouse on career intentions. These questions were recoded to form the dummy variables FAMENV and CARAGREE respectively, and measure the negative effects of dissatisfaction or disagreement. The variables MORALE and MILSAT are dummy variables used to measure the negative effects of low morale and feelings of overall dissatisfaction with military life, respectively.

TABLE 10

SATISFACTION VARIABLES

Variable name	Survey variable
CARAGREE	Your Career Agreement (O66E63)
FAMENV	Satisfaction with Family Environment (O109105-)
MORALE	Describe Morale (O107E103)
SATMIL	Military Life (O110E106)
JOBSAT	Satisfied with Job (O109105-)
FREEDOM	Personal Freedom (O109105-)
PAYSAT	Satisfied with Pay (O109105-)
WORKENV	Satisfied with Work Environment (O109105-)

Source: Authors

The remaining variables were taken from questions asking the respondent to rate satisfaction with job, personal freedo', pay, and work environment on a seven point scale. They were recoded as dummy variables and should be negatively correlated with turnover, indicating that greater dissatisfaction leads to increased propensity to leave the organization. Although the variable SATMIL is highly correlated with the variables JOBSAT, FAMENV, PAYSAT, FREEDOM, and WORKENV, it is possible that even though one may experience satisfaction with job, benefits, or family, they may <u>still</u> be dissatisfied with military life overall, providing a heavy influence towards any decision to quit.

Variables to measure expectations concerning various aspects of job and personal financial outlook were created in a similar manner. To measure the effect of perceived civilian job opportunities a question asking the respondent to rate his chances of finding a better job as a civilian was recoded as a dummy variable to form the variable JOBALT. The dummy variable NXTDUBAD measures the negative effect of expectations regarding the respondent's next duty assignment. The <u>DOD Survey</u> question asked the respondent to rate his chances that his next assignment would be to an undesirable locale. For the purposes of this study, this variable attempts to capture the negative effects that instability, frequent moves, and other unique aspects of military life might have on the individual's decision to leave. Whenever the respondent rated

his probability of being assigned to an undesirable locale as "highly probable" or better, the NXTDUBAD variable assumed the value of one.

Another variable to measure expectations of promotion using a question (O32) that asked the respondent to rate his chances of promotion on a seven point scale was recoded as the dummy variable EXPPROMO. Those people rating their chances of promotion as remote might be expected to exhibit a higher propensity to quit. Another variable to measure met expectations concerning "Life in the Military" was taken from a survey question that asked the respondent to rate how well the military had met his expectations. The base case occurred when the respondent indicated a positive response, such that the dummy variable MILXPECT was coded to pick up the effects of failure of the military to meet the respondent's expectations.

TABLE 11

EXPECTATIONS VARIABLES

Variable name	Survey variable
JOBALT	Good Job Alternatives (O96E92)
NXTDUBAD	Next Tour Unfavorable (O30E29)
EXPROMO	Promotion Expectations (O32)
MILXPECT(ations)	Life in Military (O108104A)

Source: Authors

The dependent variable, called "Y," was constructed using the question "Years of Service" (027E26), which asked each respondent to indicate the expected number of years of service he planned to serve. Those officers indicating an intent to serve 20 or more years were considered to be "career oriented," which corresponded to the dependent variable assuming a value of "1." Otherwise, the value of "Y" became "0," corresponding to an intended leaver.

B. PRELIMINARY ANALYSIS FOR NAVAL AVIONICS CENTER DATA

The survey administered at the Center provided data for 39 variables (some of which were not relevant to this analysis).

1. Variable Construction

The demographic variables were taken from questions assessing the education level (beyond a Bachelor's degree), marital status, number of dependents, employment status of the respondent's spouse, and whether the respondent had looked for a job or been offered a job in the past year. The variables are listed in Table 12.

Theoretical expectations are that postgraduate education might lead to greater job market flexibility, particularly for younger employees, and greater turnover intent. Note that this expectation is counter to that of the military sample, since most graduate education in the military is at least partially funded, and involves an additional service commitment. (Funded programs quite similar to those

TABLE 12

DEMOGRAPHIC VARIABLES

Variable name	Variable Description
ED	Education level (B.S. is base case)
MARRIED	Marital status (single is base case)
DEP	indicates presence of dependents (no dependents is base case)
WIFEWORK	indicates whether wife is employed in a full time position
JOBOFFER	indicates job offer in past year
JOBLOOK	indicates whether sought job in past year

Source: Authors

of the military are available at the Center, however, they are seldom used). Marital status could have varying effects, depending upon the employment status of the respondent's wife. A spouse employed outside the home might increase the propensity to leave by providing a financial "parachute" while seeking a new job. The reverse case is that a spouse with a satisfying and financially rewarding job may be reluctant to relocate if the respondent finds an acceptable alternative that is geographically incompatible with the wife's place of employment. Also, marriage involves an obligation to provide for the spouse, and therefore, job security may take on more importance to married employees and reduce their likelihood of leaving. The presence of additional dependents is likely to

reinforce this notion. The variables JOBOFFER and JOBLOOK are self-explanatory, providing an indication of possible intent to seek work elsewhere as well as the existence of an alternative. All of the above variables were coded as dummy variables and with single, no dependents, no postgraduate education, and no job offers or looking for a job in the past year as the base case.

Several variables were formed to measure expectations. The first variable, titled NACXPECT, provides an indication of the extent to which the Naval Avionics Center met each employee's expectations. Failure to meet expectations would increase the propensity to leave. The second variable, BETOFF2, provides an indication of the respondent's perception regarding whether or not his family could be better off if he left the Center. A positive response should increase the probability of turnover as well. The third variable, EXPROMO, measured the respondents expectation regarding promotion to the next higher grade. Assuming that an engineer or scientist can find an acceptable job alternative, respondents with little perceived chance for advancement would likely exhibit a higher propensity to leave. The final variable (JOBALT) indicates the respondent's estimate of his chances of finding a better job. An employee who rates his chances as high is more confident in his ability to find better work elsewhere and may be more likely to leave. All of these variables are dummy variables as well, with negative expectations regarding

job alternatives, and that the family could be better off if the respondent left the Center, and positive expectations regarding promotion, and whether the Center met prior expectations as the base cases.

TABLE 13

EXPECTATION RELATED VARIABLES

Variable name	Variable Description
NACXPECT	indicates whether employment at the Center met initial expectations
BETOFF2	indicates whether respondent feels that family could be better off if he left the Center
EXPROMO	indicates whether respondent expects to be promoted
JOBALT	indicates whether respondent feels he has a good or better chance of finding a better job outside the Center

Source: Authors

Since employees at the Center are not subject to involuntary transfers, there was no equivalent measure to the variable NXTDUBAD used in the military sample. All of the expectations related variables were coded as dummy variables, with a positive response as the base case. Consequently, the variables should relate negatively to turnover.

Tenure variables are age (AGE) and length of service (LOS), and are self-explanatory. These variables were

continuous, and should exhibit a positive relationship to turnover. Although one might suspect that these variables

TABLE 14

TENURE VARIABLES

Variable name	Variable Description
AGE	Age (in years)
LOS	Length of service (in years)

Source: Authors

are highly correlated, the nature of Civil Service employment and retirement systems is such that age may have no bearing on length of service, therefore both variables may be of interest. (In fact, a chi-square test found these variables to be independent and they were only mildly correlated.) In the Civil Service, entry is at the GS-7 level and promotions through GS-9 and GS-11 to GS-12 follow within a three-year period. This is followed, however, by many years spent at the GS-12 level. There is no requirement to be promoted beyond this level. This is not the case in the military, where the vast majority of officers are of similar ages at a corresponding length of service, and either progress through the ranks or face involuntary resignation. Also, the military is unable to hire people for lateral entry, and entrants are subject to specific maximum age requirements upon entering an officer procurement program.

Satisfaction variables were created to measure satisfaction with life at the Naval Avionics Center, with pay and allowances, with the amount of freedom in the workplace, and with the actual job and work environment. In addition, respondents were asked to rate the level of morale in their department. A final variable, BETOFF, measures the respondents feelings regarding the impact of employment at the Center on his family situation, by asking him to rate whether or not his family would actually be better off if he left his job at the Center. Theoretical expectations are that dissatisfaction with any of these aspects, or low morale, will increase the likelihood of turnover.

TABLE 15

SATISFACTION VARIABLES

Variable name	Variable description
SATNAC	measures satisfaction with life at the Center
PAYSAT	measures satisfaction with pay
FREEDOM	measures satisfaction with the amount of freedom in the job afforded at the Center
JOBSAT	measures job satisfaction
WORKENV	measures satisfaction with work environment at the Center
MORALE	rates morale in the workplace
BETOFF	indicates whether respondent feels that family would be better off if he left the Center

Source: Authors

The dependent variable, termed LIFER in this model, was constructed based upon the response to three separate questions and is a function of the Civil Service retirement system, as well as the Naval Avionic Center's concept of "career." The first question asked the respondent to indicate how many additional years he expected to remain at the Center. If the response was 12 years or greater, the variable assumed the value "1." The variable could also assume the value "1" when the combination of the actual number of years already served at the Center, added to the expected number of years one expected to remain, was greater than 20 years. Finally, in order to account for those people hired into the Civil Service late in their lives, and who might be eligible for retirement at age 55 or greater with only a few years of service, the LIFER variable assumed the value "1" when the total of age and expected length of service was 55 or greater, Any other responses corresponded to an intended leaver, in which case the variable LIFER assumed the value "0."

Simple correlation analysis was conducted in order to determine the correlates of turnover. The results of this analysis are listed in Table 22 of Chapter V. In addition, correlation between variables was checked in order to minimize the effects of multicollinearity in the multivariate model also discussed in Chapter V.

C. MULTIVARIATE ANALYSIS

Based upon the model depicted in Figure 1, and the results of the correlation analysis discussed above, variables that exhibit significant individual correlations across samples were used in a multivariate Logistic regression to determine the relative effects of each variable on the turnover decision. The results will be presented in Chapter V.

IV. ANALYSIS OF MILITARY SAMPLES

The following chapter provides the results of both correlation and multivariate analysis of the determinants of turnover in the surface warfare and submarine officer communities. Each community is addressed separately. A comparative analysis will be presented in Chapter VI. The surface warfare community is presented first, followed by the submarine community.

A. THE SURFACE WARFARE COMMUNITY

The correlates of turnover in the Surface Warfare community are presented in Table 16. The table lists Pearson first order correlation coefficients for all variables. All significant variable correlations exhibited the expected signs, with the exception of the variable CARAGREE. The previously defined variables CURRED, NXTDUBAD, JOBOFFER, WIFEWORK, and INCSAT were not significantly correlated at the $p < .10$ level.

1. Correlation Analysis

Results of correlation analysis appear to support a priori expectations. Some variables do appear to be less correlated to turnover than originally expected, however logical reasons for these findings do exist. For instance, in the case of the variable JOBOFFER, the fact that the

turnover decision must be made at a certain point in time and a minimum six month notification period is required prior to voluntary separation may make the effect of an "in hand" job offer a negligible consideration to a military officer. After all, he is not able to accept a new job on a moment's notice. On the contrary, the decision to leave the military must be planned between assignment changes, which also includes the associated negotiating period that accompanies each new assignment. The average length of these assignments is 24 to 30 months. As a result, the effect of a job offer may only be meaningful to an officer who has already decided to leave and has, at least in his own mind, initiated the separation process or is close to making that decision.

For the same reasons cited above, particularly with respect to the length of assignment, the opportunity for the spouse to find a well-paying job may be limited. Military families may only be in one location for a few years and despite laws which prohibit discrimination on this basis, military spouses may have a reputation as being poor "investments" by firms looking for long-term career oriented employees. The Economic Report of the President--1988 [Ref. 63] states that over 60 percent of all women in the United States are working, yet only 45 of the 135 married respondents (33 percent) indicated that they had a working spouse. Therefore, for those with working wives, their pay may not be substantial enough to provide the postulated economic

"parachute" during a pericd of job search. For those with non-working wives, and particularly those who also have children, other priorities may be at work, such as the rearing of children or the decision that the costs of childcare outweigh the benefits of employment. In any case, the variable WIFEWORK proved not to be a significant factor affecting career orientation behavior.

The fact that satisfaction with pay (INCSAT) is not correlated with turnover is not surprising, since it was listed as both a satisfier and dissatisfier in the Exit and Retention surveys cited in Chapter I. Apparently, the effects of pay are unique to the individual, possibly tempered by work conditions, family environment, and external alternatives. It is apparent that they are not strong enough to stand out as a direct correlate of turnover.

The failure of the variable CURRED to be significantly correlated to turnover may be a function of the fact that so few officers are given the opportunity for postgraduate education. This is due to the nature of career paths and commitments to "punch tickets" of various types in order to move up the career ladder. Only ten percent of the Surface Warfare sample possessed an advanced degree, making the variable applicable to only a small part of the sample. The variable NXTDUBAD may not show a distinct correlation for the same reason, since only five percent of the sample had strong negative expectations regarding their next assignment.

TABLE 16

RESULTS OF FIRST ORDER CORRELATIONS WITH TURNOVER

SURFACE WARFARE: n = 195

Variable	Pearson Correlation Coefficient
AGE	.27 *
LOS	.24 *
CURRED	.02
NXTDUBAD	+.09
EXPROMO	-.41 *
CARAGREE	+.15 *
JOBOFFER	+.06
JOBLOOK	-.24 *
JOBALT	-.15 *
WIFEWORK	.05
MORALE	-.14 *
MILXPECT	-.11 (p =.12)
INCSAT	-.06
BETOFF	-.24 *
FREEDOM	-.27 *
FAMENV	-.12 **
JOBSAT	-.32 *
WORKENV	-.34 *
SATMIL	-.53 *
MARRIED	.23 *
DEP	.16 *

* p < .05 level of significance
** p < .10 level of significance

Source: Authors

The variable MILXPECT failed to show significant correlation as well. This may be due to the fact that the

sample has been restricted to those persons with at least four years of service. Based upon the life cycle theories of employment discussed in the literature [Refs. 31,56], any adjustment to the organization should be completed by this time and would have an insignificant immediate effect on turnover.

The variable CARAGREE has a positive sign that is contrary to expectations. A possible explanation for this finding is that disagreement on the issue of career may be a generally accepted fact of life in the Surface Warfare community, and does not influence career intent.

2. Multivariate Regression Analysis

Based upon the correlation analysis presented above, all significant variables (at the ten percent level of significance) were used as explanatory variables in a Logit regression with dependent variable "Y," representing intent to stay. In addition, the variable NXTDUBAD was retained in the model due to strong a priori expectations that this factor affects the turnover decision process, particularly in the case of an officer who is close to making the decision to quit or stay in the Navy. The results are presented in Table 17.

The results indicate that length of service (LOS), promotion expectations (EXPROMO), likelihood of finding an acceptable job alternative (JOBALT), expectations that the family would be better off if the respondent left the Navy (BETOFF), and overall satisfaction with military life (SATMIL)

TABLE 17

RESULTS OF REGRESSION ANALYSIS

SURFACE WARFARE: n = 195, R = .63

Variable	Beta Coefficient
INTERCEPT	1.13 (p = .21)
LOS	.39 *
NXTDUBAD	+3.14
EXPROMO	-2.94 *
JOBLOOK	- .20
JOBALT	-1.03 *
MORALE	- .02
CARAGREE	.43
FREEDOM	.18
FAMENV	1.39 **
BETOFF	-1.20 *
JOBSAT	- .78
WORKENV	- .19
SATMIL	-3.52 *
MARRIED	.84 (p = .20)
DEP	.56

* p < .05 level of significance
** p < .10 level of significance

Source: Authors

were all significant at the five percent level of significance and exhibited the proper signs. The variable FAMENV, which indicated satisfaction with family environment, was significant at the ten percent level of significance, however it was positively signed. This may be a result of multicollinearity with other variables, or it may indicate

that Surface Warfare officers display dissatisfaction with family environment but remain in the Navy in spite of it.

The variables CARAGREE and FREEDOM were positively signed, but insignificant, therefore caution must be used when interpreting the effects of these variables. One other variable that was positively signed, which was contrary to expectations, was the variable NXTDUBAD, which had a large beta coefficient estimate but was insignificant. This may be a result of limited variance in the response, as discussed above, or the fact that most officers remain in spite of expectations that their next duty station will be at an undesirable location.

As a measure of goodness of fit of the model, a simple classification table indicates that it correctly predicts the outcome of turnover intent with an accuracy of 90.3 percent. The partial effects of each variable in the Logit analysis are presented in Table 18. The base case represents a single officer with a mean value of 7.05 years of service, who expresses satisfaction with all aspects of the military and his family life, has not looked for or has no strong expectations regarding ability to find an acceptable civilian job , and has positive expectations regarding promotion and the location of his next duty station. His probability of remaining on active duty is 98 percent. The values in the table indicate the individual effect on this probability caused by each variable.

TABLE 18

PARTIAL EFFECTS OFREGRESSION ANALYSIS

SURFACE WARFARE: n = 195

Variable	Partial Effects
LOS	+ .01 # *
NXTDUBAD	+ .02
EXPROMO	- .18 *
JOBLOOK	- .01
JOBALT	- .03 *
MORALE	- .01
CARAGREE	+ .01
FREEDOM	0
FAMENV	+ .01 **
BETOFF	- .04 *
JOBSAT	- .02
WORKENV	- .01
SATMIL	- .39 *
MARRIED	+ .01
DEP	+ .01

\# evaluated for each additional year of service
* p < .05 level of significance
** p < .10 level of significance

Source: Authors

B. THE SUBMARINE OFFICER COMMUNITY

The results of first order correlations with turnover for the submarine community are presented in Table 19. The following variables were found not to be significantly correlated at the ten percent level of significance: CURRED, NXTDUBAD, CARAGREE, JOBOFFER, WIFEWORK, INCSAT, AND WORKENV.

All variables, with the exception of WIFEWORK exhibited the expected signs.

TABLE 19

RESULTS OF FIRST ORDER CORRELATIONS WITH TURNOVER

SUBMARINERS: n = 102

Variable	Pearson Correlation Coefficient
AGE	.37 *
LOS	.38 *
CURRED	.15 (p = .12)
NXTDUBAD	-.06
EXPROMO	-.47 *
CARAGREE	-.01
JOBOFFER	-.04
JOBLOOK	-.25 *
JOBALT	-.16 **
WIFEWORK	.07
MORALE	-.21 *
MILXPECT	-.24 *
INCSAT	-.07
BETOFF	-.18 **
FREEDOM	-.34 *
FAMENV	-.30 *
JOBSAT	-.22 *
WORKENV	-.08
SATMIL	-.39 *
MARRIED	.17 **
DEP	.24 *

* p < .05 level of significance
** p < .10 level of significance

Source: Authors

1. Correlation Analysis

The results of first-order correlations are similar to those of the surface warfare sample. The variable CURRED is probably not highly correlated due to limited dispersion, since only nine of 102 respondents possessed postgraduate education. The same is true of the variable NXTDUBAD, which is severely limited by the fact that only three respondents indicated a strong positive expectation that their next tour would be in an undesirable locale. In the case of the variable WIFEWORK, 29 of 72 (40 percent) married respondents had working wives, however despite this moderate increase in the percentage of working wives compared to the Surface Warfare sample, the variable still failed to show up as a significant correlate to turnover. Pay (INCSAT) failed to be significant, as did career agreement (CARAGREE). Pay is substantially higher in the submarine community, averaging an additional $16,000 annually (due to hazardous duty and nuclear power incentive pays), therefore pay is less likely to be an issue in this community. Career agreement with spouse (CARAGREE) did not appear to correlate at all with turnover, indicating that it simply may not be an issue with either officer community.

The variable JOBOFFER did not correlate with turnover. This is most likely due to the fact that nuclear-trained engineers are in high demand in civilian industry. They often receive unsolicited job offers in the mail. However, nuclear

trained officers are usually obligated for additional service in multi-year increments due to the nature of nuclear "incentive pay" retention bonuses. Therefore, a job offer must be timed to coincide with the officer's end of obligated service if it is to have any real influence on the turnover decision. This is also supported by the fact that the variable JOBLOOK is highly correlated, indicating that a submariner looking for a job is likely to leave, but a job offer in and of itself is not likely to have a significant impact.

The fact that the variable WORKENV is not significantly correlated with turnover is not so surprising either. The work environment aboard submarines is notoriously stressful and demanding. Submariners work long hours inport, and are known for perfectionist attitudes regarding engineering practices as well as the "warfighting" aspects of their craft. Consequently, dissatisfaction with the work environment may be an accepted aspect of association with the community. In fact, submariners take justifiable pride in their ability to do a good job in such difficult conditions.

Another interesting finding is that unlike the surface warfare community, the variable MILXPECT is significantly correlated with turnover in the submarine community, which may be a function of the fact that the training pipeline for submariners is much longer than that of surface warfare officers, and they do not adjust to employment expectations

until later in their careers. Perhaps life on a submarine is not as glamorous as imagined, particularly with respect to the number of hours worked and the requirements for perfection and paperwork that accompany work with the nuclear propulsion plant.

2. Multivariate Regression Analysis

Based upon the correlation analysis, all variables significantly correlated with turnover at the ten percent level of significance, and the variable NXTDUBAD, were used as explanatory variables in a multivariate Logit regression with dependent variable "Y." The results are presented in Table 20.

The only significant variables in this regression are length of service (LOS), expectation that the next duty station will be at an undesirable locale (NXTDUBAD), expectations regarding promotion (EXPROMO), and satisfaction with family environment (FAMENV). All of these variables are signed as expected. Of the remaining variables, met expectations regarding the military (MILXPECT), job satisfaction (JOBSAT), and presence of dependents (DEP) are the only variables whose signs do not agree with expectations. However, they are not significant and as with any insignificant variable, their effects should be interpreted with caution.

The implication of these results is that there are fewer significant factors affecting the "career orientation"

TABLE 20

RESULTS OF REGRESSION ANALYSIS

SUBMARINERS: n = 102, R = .48

Variable	Beta Coefficient
INTERCEPT	-1.49 (p = .19)
LOS	.54 *
NXTDUBAD	-4.02 *
EXPROMO	-2.65 *
JOBLOOK	- .37
JOBALT	- .00
MORALE	- .90
MILXPECT	.19
BETOFF	- .63
FREEDOM	- .69
FAMENV	-1.53 *
JOBSAT	+ .30
SATMIL	- .60
MARRIED	.66
DEP	- .26

* p < .05 level of significance
** p < .10 level of significance

Source: Authors

decision of submariners. Met expectations appear not to be significant determinants in the decision process, nor does job satisfaction. The presence of dependents however, appears to stimulate turnover behavior. Perhaps the unusual demands on family life that accompanies duty in the submarine community combined with a perceived availability of jobs in the civilian community makes leaving the Navy seem more attractive. The

significance of the variable FAMENV also supports this contention, as does the zero coefficient of the variable JOBALT (which indicates that submariners are extremely confident about finding an attractive job outside the military as evidenced by the fact that 75 percent of the sample rated their chances as high).

As a measure of goodness of fit of the model, a classification table reveals that the model correctly predicts turnover intent with 85.3 percent accuracy. Partial effects are presented in Table 21. Again, the base case is for a single officer who expresses satisfaction with all variables and has a mean length of service of 6.84 years. Such an officer has a .90 probability of remaining on active duty.

TABLE 21

PARTIAL EFFECTS OF REGRESSION ANALYSIS

SUBMARINERS: n = 102

Variable	Partial Effect
LOS	+ .04 # *
NXTDUBAD	- .76 *
EXPROMO	- .51 *
JOBLOOK	- .04
JOBALT	- .00
MORALE	- .11
MILXPECT	+ .02
BETOFF	- .07
FREEDOM	- .08
FAMENV	- .24 *
JOBSAT	+ .02
SATMIL	- .07
MARRIED	.05
DEP	- .03

evaluated for each additional year of service
* p < .05 level of significance

Source: Authors

V. ANALYSIS OF THE NAVAL AVIONICS CENTER SAMPLE

The following chapter presents the findings of the correlation and resultant multivariate analysis of the data taken at the Naval Avionics Center. It is important to recall that the dependent variable in this case, LIFER, is not the same as that used for the military samples, and that there is no equivalent variable in this sample to measure expectations regarding location of next duty station (NXTDUBAD), or career agreement with spouse (CARAGREE). In addition, only 31 of the 136 (23 percent) respondents indicated "career intent" at the Center. Based upon expectatations, and ease of interpretation, all variables were coded such that age (AGE), length of service (LOS), married (MARRIED), and the presence of dependents (DEP) should be the only variables that exhibit a positively signed correlation to intent to stay.

A. CORRELATION ANALYSIS

The results of first order correlations with turnover at the Naval Avionics Center are presented in Table 22. Education (ED), expectations regarding promotion (EXPROMO), presence of a working spouse (WIFEWORK), satisfaction with pay (PAYSAT), satisfaction with personal freedom in the workplace (FREEDOM), satisfaction with work environment, and marriage (MARRIED) were not significant correlates of turnover at the

TABLE 22

RESULTS OF FIRST ORDER CORRELATIONS WITH TURNOVER

NAVAL AVIONICS: n = 136

Variable	Pearson Correlation Coefficient
AGE	.41 *
LOS	.29 *
ED	.01
EXPROMO	-.04
JOBOFFER	-.22 *
JOBLOOK	-.22 *
JOBALT	-.31 *
WIFEWORK	.01
NACXPECT	-.19 *
MORALE	-.27 *
PAYSAT	-.04
BETOFF2 (COULD)	-.28 *
FREEDOM	.07
BETOFF (FAMENV)	-.20 *
JOBSAT	-.14 (p = .11)
WORKENV	-.01
SATNAC	-.30 *
MARRIED	.13 (p = .13)
DEP	.17 *

* p < .05 level of significance
** p < .10 level of significance

Source: Authors

ten percent level of significance. All variables exhibited the expected signs with the exception of ED and FREEDOM.

The variable ED, which accounted for postgraduate education, was positively signed, indicating that better

educated people intended to remain at the Center. This is counter to expectations based upon the theory that a better educated person would have greater opportunities for alternative employment in the private sector. A possible explanation for this phenomena might be that the education was obtained through a government funded program which required additional obligated service, however the data to substantiate this is not available. This result must be viewed with caution as well, since the number of people possessing graduate degrees was less than ten percent of the sample. A crosstab did show that the age and length of service distribution of graduate education was fairly uniform, therefore education and tenure are not correlated.

The positive, but minimal correlation exhibited by the FREEDOM variable is also counter to expectations, and is likely a result of the small number of respondents (nine of 126) that indicated any dissatisfaction with this aspect of the Center. Consequently, this result must be viewed with skepticism.

The failure of promotion expectations (EXPROMO) to be a significant correlate is most likely due to the fact that most promotions in the civil service system at the Center are relatively "automatic" up to the GS-12 level. As a result, this variable may not have much meaning to persons in the four to 12 years of service category, since they know that promotion beyond this level is difficult and may take several

years. It is also possible that an older employee who does not expect to be promoted is probably one who fits into the "beneficial turnover" category and is not a good candidate for retention.

The presence of a working spouse (WIFEWORK) exhibited no correlation with turnover, although 68 percent of the married respondents had working wives. Apparently, the economic "parachute" theory does not apply to this sample either, possibly due to the fact that the vast majority of married employees have working spouses, making it difficult to differentiate the effects of the "parachute" for those who have it as compared to those married employees whose spouses are not employee outside the home. Satisfaction with pay (PAYSAT) is not a significant factor affecting turnover in this sample either.

Response to the survey question regarding satisfaction with work environment (WORKENV) was split, with half the respondents indicating dissatisfaction. However, this factor was not correlated to turnover. This might imply that despite dissatisfaction with the actual working environment, employees do not consider it an important deterrent to remaining at the Center. Of course this dissatisfaction may manifest itself in other variables by contributing to overall dissatisfaction with the Center (SATNAC) or the job (JOBSAT). However, tests of independence between these variables suggested that they are separate measures.

Marital status was not quite significant as a factor affecting turnover, however the presence of dependents tends to reinforce individual intent to remain at the Center. A possible reason for this is that the long-term financial responsibilities associated with dependents may affect the need for job security and moderate the turnover decision, whereas marriage involves merely an implied responsibility, which may be lessened if the spouse is employed.

B. MULTIVARIATE REGRESSION ANALYSIS

Multivariate Logit analysis was conducted using those variables exhibiting correlation at the $p < .10$ level of significance. The results are presented in Table 23. This regression differs from those done for the military samples in two important aspects. First, variables for both age (AGE) and length of service (LOS) were retained, since a test for independence indicated that they were in fact independent variables in this sample. The second major difference involves the absence of a variable for marital status, which proved to be an insignificant correlate of turnover. In the absence of any strong notions regarding the effect of this variable on the civilian population, the variable was not retained in the regression.

The Logit analysis results reveal that the intercept term and the variables AGE, LOS, JOBOFFER, JOBALT, BETTOFF2, SATNAC and DEP are significant at the ten percent level of

TABLE 23

RESULTS OF REGRESSION ANALYSIS

NAVAL AVIONICS: n = 136, R = .503

Variable	Beta Coefficient
INTERCEPT	-5.93 *
LOS	.17 **
AGE	.14 *
JOBOFFER	-1.31 *
JOBLOOK	- .57
JOBALT	-1.96 **
MORALE	+ .02
BETOFF (COULD)	+1.61
BETOFF2 (FAMENV)	-2.18 **
JOBSAT	+ .34
SATNAC	-2.11 *
NACXPECT	- .71
DEP	.92 **

* p < .05 level of significance
** p < .10 level of significance

Source: Authors

significance. The variables for job satisfaction (JOBSAT) and expectations regarding how much better off the respondent's family would be if he quit (BETOFF) were insignificant and positively signed. All other variables exhibited the expected signs.

The implication surrounding the resultant sign of the variable JOBSAT is that expressed job dissatisfaction does not significantly affect intent to leave. A similar inference

can be drawn from the results concerning the variable BETOFF, which implies that despite strong feelings that the family could be living a much better life if the respondent accepted employment elsewhere, this factor tends to influence him to stay at the Center. These results must be viewed with caution however, since these variables are not significant.

The issue does become significant when the individual expresses dissatisfaction with current family environment (BETOFF2), indicating that expectations simply do not carry the same weight as the actual experience. It may be easier to rationalize the decision to remain at the Center despite feelings that your family could be better off if you left, as long as you are not experiencing actual dissatisfaction with family environment. However, once this dissatisfaction crops up, it becomes an extremely strong deterrent to remaining at the Center.

Global satisfaction with the Center (SATNAC) was another important factor influencing turnover intent. Expressed dissatisfaction with the Center has a substantial effect on the probability of remaining at the Center, as do the variables JOBOFFER and JOBALT. Partial effects of each variable, evaluated using a mean length of service of 5.7 years and age of 32.3 years, are presented in Table 24.

The base case probability of an individual demonstrating career orientation at the Center is .39. This represents a single 32 year old male with 5.7 years of service who

expresses no dissatisfaction or negative expectations about the relevant factors included in the model. A classification table indicates that this model predicts the proper turnover outcome with 87.5 percent accuracy.

TABLE 24

PARTIAL EFFECTS OF REGRESSION ANALYSIS

NAVAL AVIONICS: n = 136

Variable	Partial Effect
LOS	+ .04 # **
AGE	+ .04 # *
JOBOFFER	- .24 *
JOBLOOK	- .12
JOBALT	- .31 *
MORALE	0
BETOFF (COULD)	+ .37
BETOFF2 (FAMENV)	- .32 *
JOBSAT	+ .09
SATNAC	- .32 *
NACXPECT	- .15
DEP	+ .23 *

\# evaluated for each additional year of service
* p < .05 level of significance
** p < .10 level of significance

Source: Authors

VI. COMPARATIVE ANALYSIS

This chapter presents a comparative analysis of the individual findings discussed in Chapters IV and V. By looking at each sample community in a comparative light, differences in the factors that affect career orientation, both in terms of significance and magnitude, become more apparent. In addition to this analysis, a basic framework for explaining these differences is presented as a stepping stone for further research.

A. PRELIMINARY SAMPLE COMPARISONS

In order to determine if the surface warfare and submarine officer samples were statistically separate, regular Ordinary Least Squares regressions were run on both samples using all of the variables identified as possible correlates with turnover (prior to initial correlation analysis). The regressions were then compared using the Chow test. The results showed that one could reject the hypothesis that the regressions were equal. Consequently, although the data was taken from the same survey instrument, the samples appear to be separate.

All final sample models were also tested for collinearity using the ordinary least squares regression procedure. Moderate to severe multicollinearity was present in all of the

models (results in Appendix E). As a consequence, caution should be used in interpreting the individual effects of variables when using these models. However, the alternative of identifying those variables contributing most to collinearity and selectively removing them was considered inappropriate since this procedure drastically reduced the predictive abilities of the Logit models. It also prohibited determination of the individual effects of factors that are in fact significant.

Actual sample characteristics have been discussed briefly in the previous chapters, however, a comparative view of the demographics of each sample is presented in Table 25.

TABLE 25

COMPARATIVE SAMPLE DEMOGRAPHICS

	n = 195	n = 102	n = 136
Variable	SWO	Sub	NAC
AGE (in years)	30.6	29.4	32.3
LOS (in years)	7.1	6.8	5.7
MARRIED	135	72	90
DEP	97	45	66
"Y"/LIFER	138	54	26

Source: Authors

The table reveals that the relative ages and lengths of service in each community are similar. Data regarding marital and dependent status are similar as well. The glaring

difference between communities becomes apparent in the number of persons expressing intent to remain with the organization for "career" purposes. It is important to keep this factor in mind when comparing the partial effects of individual variables across communities, because computation of the base probability of staying at the organization is directly dependent upon this initial declaration of intent.

As a related comparison, a Logit regression was run on the combined submarine and surface warfare sample to determine the effects of designator differences on intent to stay. Using the same methodology that was used to develop individual community models, a model was developed for this combined sample that retained the variables LOS, EXPROMO, JOBLOOK, JOBALT, NXTDUBAD, MORALE, MILXPECT, FREEDOM, FAMENV, JOBSAT, WORKENV, SATMIL, MARRIED and DEP, and also included a dummy variable for the submarine designator. The model revealed that a satisfied single submarine officer is nine percent less likely to stay in the Navy.

B. COMPARISON OF SIGNIFICANT VARIABLES

Basic correlation analysis revealed differences in the factors affecting career orientation across the three communities. These results are summarized in Table 26. Those variables that were correlated at the $p < .10$ level of significance are indicated by an "X" in this table. Variables

that were not applicable to the sample are indicated by "NA" in the table.

TABLE 26

SUMMARY OF SIGNIFICANT CORRELATES OF TURNOVER

Variable	SWO	Sub	NAC
AGE	X	X	X
LOS	X	X	X
NXTDUBAD			NA
CURRED/ED			
EXPROMO	X	X	
CARAGREE	X @		NA
JOBOFFER			X
JOBALT	X		X
JOBLOOK	X	X	X
WIFEWORK			
MORALE	X	X	X
MILXPECT/NACXPECT		X	X
INCSAT/PAYSAT			
BETOFF/BETOFF2	X	X	X
FAMENV/BETOFF	X	X	X
FREEDOM	X	X	
JOBSAT	X	X	
SATMIL/SATNAC	X	X	X
WORKENV	X		
MARRIED	X	X	
DEP	X	X	X

@ variable sign not as expected

Source: Authors

The variables ED/CURRED, WIFEWORK and INCSAT/PAYSAT were not significant across the three sample communities. The variables AGE, LOS, JOBLOOK, MORALE, BETOFF, FAMENV/BETOFF2, SATMIL/SATNAC and DEP were significant across all three samples. Of particular interest however, are the variables that exhibited differences in significance across communities. For instance the variable EXPROMO was only significant in the military samples, probably as a result of the "up or out" policy associated with military service. The variable CARAGREE was only significant to the surface warfare community. This may be a result of the unique nature of surface warfare duty in that it involves lower pay and a large amount of family separation. Career agreement may revolve around the financial necessity for the wife to work in order to afford decent housing and a "comfortable" family lifestyle. This may involve decisions such as opting for self-imposed separations as the member assumes geographic bachelor status while the spouse pursues her own career or family agenda.

Job offers (JOBOFFER) are less meaningful to military personnel (unless they occur at a period that coincides with their planned date of separation). Civilians, however, view job offers as an important factor affecting the turnover decision. Perceived job alternatives (JOBALT) is not an important factor to submarine officers, because they generally are confident of finding a good civilian job due to the specialized training they receive that is easily transferrable

to a civilian setting. Expectations regarding the workplace (MILXPECT) were not significant to surface warfare officers. This finding tends to indicate that this community of officers generally knows what to expect when they get to their first assignments, whereas submariners and the personnel at the Center may have unrealistic expectations that tend to influence turnover when they remain unfulfilled.

Freedom in the workplace (FREEDOM) is not important to civilian engineers, probably due to the fact that the Center attempts to encourage autonomy and creativity in the workplace, and an environment that constrains people is counter to the Center's goals. Consequently most people at the Center are satisfied with the amount of freedom they have. On the other hand, one might think that freedom in the military is simply not an issue due to the structured nature of the organization as a whole. However, Naval officers may experience differing degrees of freedom solely dependent upon the attitudes and style of the commanding officer. In addition, their jobs change every two to three years, allowing them an opportunity to experience differing work environments, some of which offer substantial freedom and some that do not. As a result, Naval officers realize the constraints of the military structural system and the culture it fosters, but they also consider freedom to be a significant correlate of turnover.

The effect of job satisfaction (JOBSAT) is significant only to the military samples as well. However this result should be viewed with some caution. As stated above, Naval officers change jobs every few years. It is possible that the effect of job satisfaction is dependent upon the job the officer is filling at the time. Some jobs may be satisfying and some obviously are not. Job satisfaction in the military then, may be a function of the specific assignment in question, as well as the officer assigned to it. A job that is satisfying to one officer may be dissatisfying to another. In addition, since the officer knows that the assignment is relatively "short term," he may view dissatisfaction as a temporary condition, and although it is significant, it may not have a large effect on the turnover decision.

Perhaps a better satisfaction-based measure is overall satisfaction with the organization. This variable (SATNAC/SATMIL) was significant across all three communities. In the case of the Naval Avionics Center sample, it is likely that this "global" variable is capturing the effects of the facets of job, work environment, and freedom, all of which were insignificant in this sample. It is interesting to note that facet satisfaction appeared to be more prevalent in the military samples, whereas global satisfaction appeared to be a better measure at the Center.

Satisfaction with work environment (WORKENV) was only significant to the surface warfare community. This may be a

result of the fact that most Navy ships are at least ten years old, and several of these are approaching the 25 year mark in age. Quarters are cramped, and during deployments, the work environment becomes the living environment. You literally live your job. As a result, the working environment may not be the best. This is also true aboard submarines, however submarines are generally better maintained since they have a higher priority for parts and personnel, there aren't quite so many people aboard a submarine and submarines are manned with the highest quality enlisted personnel. Submarines are usually more up to date in terms of state-of-the-art technology, making them more comparable across classes despite age differences. The bottom line is that submariners simply have more dollars, and this makes for a somewhat better working environment.

Marital status was significant in the military samples and not quite significant ($p = .13$) in the Naval Avionics Center sample. The variable DEP, indicating the presence of dependents, was significant across all samples. A crosstab of the variables LOS and DEP to determine if there might be a higher distribution of dependents at higher age levels showed that the distribution of dependents is fairly uniform across all three samples.

C. COMPARISON OF PARTIAL EFFECTS

Table 27 provides a summary of the partial effects of the individual variables included in each of the sample regressions. When using the Logit procedure, the actual basis for comparison should be the probability of experiencing the outcome represented by the dependent variable, since the magnitude of individual variable effects is dependent upon the base case probability of this outcome. (In other words, comparing the magnitudes of the beta coefficient estimates, or the individual partial effects of variables, in a Logit regression is misleading.) The base case probability of staying in the Navy for a surface warfare officer was .98, for a submarine officer, it was .90, and for an engineer or scientist at the Naval Avionics Center, it was .39.

In the Surface Warfare community, global dissatisfaction with the Navy appears to have the largest effect on probability of remaining, decreasing this likelihood by 39 percent. Low expectations regarding promotion chances decreases this probability by 18 percent. The effects of the other remaining variables pale in comparison to these variables.

Global satisfaction was not as important to submarine officers, however low promotion expectations decreases the probability of remaining by 51 percent. And the effect of strong expectations that the next duty station will be at an undesirable locale is to reduce the probability of remaining

TABLE 27

SUMMARY OF PARTIAL EFFECTS ACROSS COMMUNITIES

Variable	SWO	Sub	NAC
AGE	NA	NA	.04 *
LOS	.01 *	.04 *	.04 *
NXTDUBAD	.02	-.76 *	NA
EXPROMO	-.18 *	-.51 *	NA
CARAGREE	.01	NA	NA
JOBOFFER	NA	NA	-.24 *
JOBALT	-.03 *	0	-.12 **
JOBLOOK	-.01	-.04	-.24
MORALE	-.01	-.11	0
MILXPECT/NACXPECT	NA	.02	-.15
BETOFF/BETOFF2	-.04 *	-.07	-.32 **
FAMENV/BETOFF	.01 **	-.24 *	-.32
FREEDOM	0	-.08	NA
JOBSAT	-.02	.02	.09
SATMIL/SATNAC	-.39 *	-.07	-.15 *
WORKENV	-.01	NA	NA
MARRIED	.01	.05	NA
DEP	.01	-.03	.23 **

* significant at the p < .05 level of significance
** significant at the p < .10 level of significance

Source: Authors

by 76 percent. This result essentially says that someone who is pretty sure that his next duty station will be in an undesirable place is going to leave the military. Family environment appears to be very important to submariners as well. Dissatisfaction with family environment decreases the

probability of remaining by 24 percent. And the presence of dependents reduces the probability by three percent.

From a policy standpoint, it appears that family-related variables tend to drive the turnover decision in the submarine community. As discussed in Chapter IV, submariners are generally confident of finding a good civilian job, and therefore the job security considerations or financial considerations that might otherwise moderate the effects of family variables do not influence the submarine officer. This may explain why the variables NXTDUBAD, FAMENV and DEP are so influential in the submarine model. In fact, this "alternative job security" may also be showing up in the magnitude of the EXPROMO variable. An officer that doesn't expect to get promoted does not need to stay around, since he can easily find a job.

The results of the Naval Avionics Center sample regressions appear to indicate that alternative job offers, expectations about family life and presence of dependents are the key factors affecting the probability of remaining. Marriage in and of itself was not a significant factor, yet having dependents increases the probability of staying by 23 percent, and high expectations that the family could be better off if the respondent left his job decreases this probability by 32 percent. In addition, the variables JOBALT and JOBOFFER can combine to produce a 36 percent decrease in the probability of remaining. In other words, a satisfied

respondent, whether married or not, with no dependents, would leave the Center basing his decision solely on a new job offer and high confidence that he can find (or in this case, has already found) a job that is better than his job at the Center.

The Naval Avionics Center results also show that failure of the Center to meet employee expectations decreases the probability of staying by 15 percent, as does global dissatisfaction with the Center. The magnitudes of these effects are not large when compared to the military samples or with the other variables in the Naval Avionics Center model.

D. CAREER ANCHORS

As discussed in the review of literature, a study of naval officers [Ref. 59], completed by Derr and based upon the work of Schein, found that the majority (85 percent) of officers possessed "managerial," "technical" or "security" career anchors. A much smaller percentage (14 percent) possessed creativity or autonomy anchors. A more specific breakdown by community is provided in Table 28. (Percentage breakdowns are provided where available). Table 28 also lists the rankings of these anchors as provided by sample responses from the Naval Avionics Center Survey. These data were gathered by asking the respondents to rank the anchors by order of importance to the respondent. Although percentages are not available as with the military samples, they are listed in

order of mean response value, which is listed in parentheses next to each response.

TABLE 28

CAREER ANCHORS BY COMMUNITY

SWO	SUB	NAC
Managerial (62%)	Managerial (36%)	Autonomy (3.5)
Technical (21%)	Technical (36%)	Managerial (3.4)
Security	Security (21%)	Security (2.8)
Creativity	Creativity	Creativity (2.7)
Autonomy	Autonomy	Technical (2.2)

Source: Authors

Table 28 reveals some unique differences in career anchors across the three samples. Specifically, both officer samples possess managerial and technical anchors whereas the Naval Avionics Center sample has more autonomy-anchored people. There are a large number of managerial anchored persons as well. In the military samples, autonomy is the least prevalent anchor. In the Naval Avionics Center sample, the technical anchor is the least prevalent.

This last result may seem surprising, since one would expect scientists and engineers to possess a "need for technical functional competence" and less of a "need for managerial experience" [Ref. 58:p. 5]. However, studies [Refs. 41,61] have shown that engineers in an industrial

setting desire autonomy above all, and lack of it is often cited as a reason for turnover.

The implication of this comparison is that differences in the magnitudes of individual effects across samples may be related to the psychological or needs-based anchors that individuals develop in the workplace. It has already been suggested that these anchors help to provide a "fit" between the worker and the workplace. As long as the worker fulfills his specific needs, which are anchored over time in the workplace, he should remain. It is possible that people with certain anchors exhibit certain general types of turnover behavior as well.

For instance, people with autonomy anchors may base the turnover decision with more emphasis towards available alternatives, expectations, and offers and less on satisfaction or biodemographic factors. People with managerial anchors may emphasize facet satisfaction with family issues over work-related issues or global work organization satisfaction in their turnover decision process. Technically anchored people may be influenced more heavily by expectations-related factors and global-satisfaction measures. Of course, differences in the factors affecting career organization may be solely due to the nature of the position or the organization, and have nothing to do with the individual filling the job, although this is unlikely.

The data presented above tend to support the contention that people with certain anchors display similar turnover behavior, however more research on this issue is required in order to make any definitive conclusions. This hypothesis is presented here only as a framework for follow-on research in an attempt to explain the results presented in the study.

VII. CONCLUSIONS

This chapter provides conclusions and recommendations for future research based upon the results of this study. In addition, specific research weaknesses are identified and discussed for the benefit of interested readers as well as future researchers.

A. RESEARCH CONCLUSIONS

The primary purpose of this thesis was to identify the factors that affect career orientation in three sample communities and estimate the magnitudes of the individual effects of these factors using an original turnover model. A secondary purpose was to propose a framework to explain experienced differences in the results across the sample communities.

The research shows that the factors affecting career orientation in the surface warfare, submarine, and Naval Avionics Center engineering community are different. First-order correlation computations with intent to stay show that education, spouse employment and satisfaction with pay are not significant across all samples. Age, length of service, presence of dependents, satisfaction with morale, family environment, global satisfaction with the organization, expectations that the family could be better off if the

employee left the organization, and whether the respondent had looked for a job in the past year are significantly correlated with intent to stay at the ten percent level of significance.

The major differences across communities involve career agreement with spouse, satisfaction with work environment, satisfaction with freedom on the job, expectations regarding promotions, and job satisfaction. The latter three factors are only significant in the military samples. The former two are significant only in the surface warfare sample. Surface warfare officers tend to demonstrate more significant facet satisfaction than both of the other communities, however, submarine officers demonstrate more facet satisfaction than the Naval Avionics Center community.

The Naval Avionics Center sample data reveals that expectations regarding, and the offer of, acceptable alternative employment are significant correlates of intent to stay. This is not the case with the military, where only the fact that the respondent had looked for a job in the past year was significant to both military samples.

Multivariate models using the significant correlates with intent to stay as explanatory variables and intent to stay as the dependent variable, proved to be fairly accurate in predicting turnover intent. All three models demonstrated at least 85.7 percent accuracy as stated in Chapters IV and V. Summary results provided in Chapter VI support the conclusion that each community shows distinct trends in the types of

variables that most affect the turnover process. Specifically, surface warfare officers are most influenced by global dissatisfaction with the Navy and promotion expectations. Submarine officers, are most influenced by expectations regarding locale of the next duty station, promotion expectations, and satisfaction with family environment. The magnitudes of the effects of the first two factors are much larger than any of the magnitudes in the other communities. The Naval Avionics Center community is most influenced by expectations regarding improvement in family life if the respondent left the Center (which is different than experienced dissatisfaction with family environment), dependents, and alternative job offers.

Each sample community also possesses a differing mix of people who have one of five career anchors. Managerial and technical anchors dominate the military communities, and autonomy and managerial anchors dominate the Naval Avionics Center sample. The differences in factors affecting the career orientation between these communities may be related to the differences in career anchors that predominate in them. Further research is needed to expand this hypothesis.

B. RESEARCH WEAKNESSES

As with any research effort, there are weaknesses in this study. These weaknesses are listed below. This list may not

be all-inclusive, however no attempt has been made to hide weaknesses from the reader.

The DOD Survey was administered in 1985. The Naval Avionics Survey was administered in 1989. There may be differences in responses due to changing attitudes over time, economic factors, and the fact that data collection involved different surveys instead of the exact same instrument.

All data is self-reported. This is particularly relevant to persons who have already decided to leave, since their responses may not be truthful and may bias results. Also, self-selection bias is present, due to the inability to sample persons outside the relevant organizations.

There may be misspecification errors in each of the multivariate models caused by ignoring such factors as sea duty, frequent moves, lack of stability, and economic factors.

Sample sizes are somewhat small. Also, the Naval Avionics Center sample is regional, therefore inferences outside of the Center may be erroneous.

The decision on the proper dependent variable for the Naval Avionics Center sample, due to unique differences in the employment and retirement systems, may not provide an adequate indication of "career intent." In addition, comparisons may not be justified since persons in the military see a concrete end date of their military "career" early in life, whereas civil service retirement depends on age at initial employment, and requires more years of service (at the same age).

The strict reliance on the use of dummy variables in regressions lends itself to possible coding errors in variable construction. (Although frequency analysis was used to code variables in such a way so as to capture their full effects.)

This thesis assumes that Derr's work on "career anchors" in the military is still current, allowing us explain possible differences in behavior.

Although all attempts were made to ensure that the Naval Avionics Center sample was randomly chosen, the researchers were unable to choose the sample and relied upon the Center to ensure that this requirement was fulfilled.

C. RECOMMENDATIONS FOR FUTURE RESEARCH

The most obvious area for further research is the study of the relationship between career anchors and turnover behavior as proposed in the preceding chapter. This would involve updating Derr's work [Refs. 56,58] and applying it along with the upcoming 1990 DOD Survey. It may be possible to get the instrument used by Derr included as part of the survey, as well as administer the same instrument to employees in various Navy civilian industrial facilities.

Another area of research involves refining the models contained in this study to reduce the existing effects of multicollinearity. The theory that global satisfaction is as valid a predictor as any combinations of facet satisfaction could also be tested. This research could be developed using

factor analysis in an attempt to study the various components that make up a global satisfaction measure. The Inclusion of additional communities for comparison is another area of possible study.

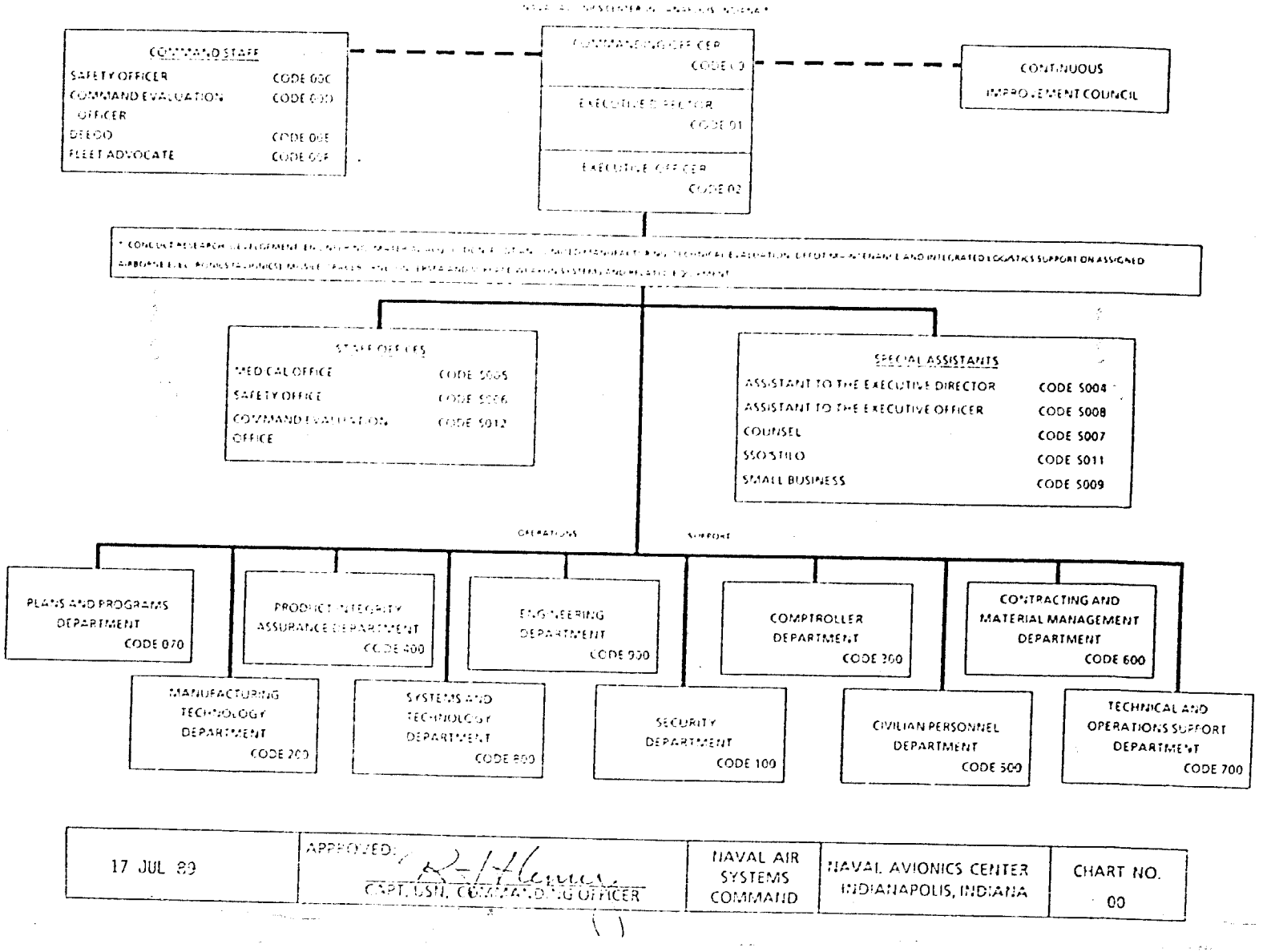
This study investigated the effects of satisfaction and dissatisfaction on turnover intent with satisfaction and dissatisfaction as dichotomous events. Investigation of the degree of satisfaction or dissatisfaction might provide better insight into the relationships between the various factors that affect the turnover process. In addition, follow-up studies, using actual turnover behavior (instead of turnover intent) as the dependent variable in the proposed models would provide a more realistic basis from which to assess policy implications.

Finally, it should be noted that the data from the Naval Avionics Survey contains much more information than that used for this study. These data may support tests of other retention and turnover models.

APPENDIX A

NAVAL AVIONICS CENTER ORGANIZATION CHART

This appendix contains a basic functional organization diagram of the Naval Avionics Center. The diagram reflects the latest organizational structure as of December 1989.



APPENDIX B

NAVAL AVIONICS CENTER DIAGNOSTIC SURVEY

This appendix contains a copy of the survey administered to the engineers and scientists employed at the Naval Avionics Center. The survey was used to collect data for use in this thesis as well as concurrent studies involving career development paths and organizational effectiveness. As a result, some of the questions contained in the survey are irrelevant for purposes of this study.

NAC DIAGNOSTIC SURVEY

The purpose of this questionnaire is to identify issues within NAC concerning job attributes, work group attributes, and career development. It is an opportunity to take stock of NAC as a place to work, to spend a career, and to register your observations, concerns, and satisfactions on a number of topics.

This questionnaire was custom designed for NAC and its' scientist and engineer communities. A few questions are standard questions addressing issues that are central to the operation of any organization. But, most of the items reflect issues of specific concern to NAC as identified through interviews. These issues were identified as potential problem areas or as success areas. This survey will allow us to see how the scientist and engineer communities feel about these issues.

After the surveys are collected, results will be tabulated and a report will be prepared which summarizes the findings.

Prof. Benjamin Roberts
Dept. of Admin. Sciences
Naval Postgraduate School

Prof. Kenneth Thomas
Dept. of Admin. Sciences
Naval Postgraduate School

LCDR Thomas Lindner
Master's Degree Student
Dept. of Admin Sciences
Naval Postgraduate School

LT Mark Davis
Master's Degree Student
Dept. of Admin Sciences
Naval Postgraduate School

GENERAL INSTRUCTIONS

1. These surveys are meant to be <u>completely</u> anonymous and confidential. Individual responses will not be seen by anyone within this organization. Do not put any identifying marks of any kind on them. When completed, please place the survey in the envelope provided and seal the envelope. Then return the survey and envelope to your departmental/divisional POC.

2. Most of the questions ask that you check one of several numbers that appear on a scale to the right of the item. You are to choose one number that best matches the description of how you feel about the item. For example, if you were asked "How much do you enjoy the weather in this area", and you are generally satisfied with the weather, you would check the number under "satisfied" like this:

	very dissatisfied	dissatisfied	slightly dissatisfied	not satisfied or dissatisfied	slightly satisfied	satisfied	very satisfied
How much do you enjoy the weather in this area. . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

Note that the scale descriptions may be different in different parts of the survey. For example, they may ask you how much you agree or disagree with something, or how satisfied or dissatisfied you are with something, or wether you think something is likely or unlikely to occur. Be sure to read the scale descriptions carefully for each section before choosing your answers.

* * * * * * * * * * * * * * * * * *

DEMOGRAPHICS

The following information is needed to help us with the statistical analyses of the data. This information will allow comparisons to be made among different groups of employees.

PLEASE ANSWER EACH QUESTION BY MARKING THE NUMBER NEXT TO THE DESCRIPTION WHICH BEST FITS YOU OR BY WRITING IN THE CORRECT INFORMATION.

1. Are you (check one):

   (0)____ Female
   (1)____ Male

2. How old were you on your last birthday?

   _____ years

3. How many years have you worked at NAC?

   _____ years

4. What is the highest level of education you have attained?

   (1) High school diploma
   (2) Associate college degree
   (3) Bachelor's degree
   (4) Master's degree
   (5) Doctoral degree

5. Are you currently married?

   (0)____ no
   (1)____ yes

6. Do you have dependents? (excluding your spouse)

   (0)____ no
   (1)____ yes

7. Your department/division is?

   _____/_____

8. Your paygrade is?

   GS- _____

9. Is your spouse currently employed outside of the home?

   (0)____ no
   (1)____ yes
   (3)____ N/A

10. What was your last performance rating?

    _____ _____

11. Have you actively pursued alternative employment opportunities within the past year?

    (0)____ no
    (1)____ yes

YOUR JOB

This section asks you how you think and feel about certain aspects of your job.

1. How satisfied are you with:	very dissatisfied	dissatisfied	slightly dissatisfied	not satisfied or dissatisfied	slightly satisfied	satisfied	very satisfied
a. current job overall. . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. fringe benefits you receive.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. coworkers/work group . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. amount of freedom you have on your job . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. opportunities for your own professional learning and growth. . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. opportunities to accomplish something worthwhile	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. your amount of pay	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h. the chances you have to take part in decisions . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
i. your job security.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
j. promotion opportunities. .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
k. assignment stability . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
l. opportunities to receive training	(1)	(2)	(3)	(4)	(5)	(6)	(7)
m. the current bonus system .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
n. opportunities to work with state of the art equipment	(1)	(2)	(3)	(4)	(5)	(6)	(7)
o. career path opportunities.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. How much do you agree or disagree with the following:	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. In general I like my job .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. I will probably look for a new job in the next year	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. What happens to the organization is really important to me	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. It would be hard for me to leave my job even if I wanted to	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. I feel personnally responsible for the work I do . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. There is poor communication between different parts of NAC	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. I often think of quitting.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

3. How much do you agree or disagree with the following:	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. Management makes it easy to get the job done	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. There is enough variety in my job	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. My job is challenging. . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. Considering my skills and effort I put into my work, I am satisfied with pay. .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. There is to much stress on my job.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

4. How likely is it that:	very unlikely	unlikely	neither likely or unlikely	likely	very likely
a. You could find an equal or better job at another organization.	(1)	(2)	(3)	(4)	(5)
b. You will look for a new job in the next 12 months	(1)	(2)	(3)	(4)	(5)
c. You will get a bonus or pay raise if you perform your job particularly well	(1)	(2)	(3)	(4)	(5)
d. You will be promoted to the next higher grade	(1)	(2)	(3)	(4)	(5)
e. You will remain at NAC for at least five more years	(1)	(2)	(3)	(4)	(5)
f. You will receive feedback from your supervisor(s) concerning your performance . . .	(1)	(2)	(3)	(4)	(5)
g. Your family would be better off if you took a new job	(1)	(2)	(3)	(4)	(5)
h. You will remain at NAC until retirement.	(1)	(2)	(3)	(4)	(5)

WORK GROUPS

This section asks you what you think about various work groups.

1. For your department, how much do you agree or disagree with the following:	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. I feel I am really a part of my work group.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. People who offer new ideas are likely to get "clobbered" . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. Each member has a clear idea of the group's goals	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. Everyone is involved in the decision making	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. My co-workers are afraid to express their real views. . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. Some of the people I work with have no respect for others. .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. Everyone's opinions gets listened to in my group . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h. morale is high.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. For your division, how much do you agree or disagree with the following:	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. I feel I am really a part of my work group.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. People who offer new ideas are likely to get "clobbered" . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. Each member has a clear idea of the group's goals	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. Everyone is involved in the decision making	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. My co-workers are afraid to express their real views. . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. Some of the people I work with have no respect for others. .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
g. Everyone's opinions gets listened to in my group . . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
h. morale is high.	(1)	(2)	(3)	(4)	(5)	(6)	(7)

GENERAL

This section asks what you think and feel concerning several areas.

1. How much do you agree or disagree with the following:	strongly disagree	disagree	slightly disagree	do not agree or disagree	slightly agree	agree	strongly agree
a. Morale is good at NAC	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. Working environment/conditions are satisfactory	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. I am satisfied with my life at NAC	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. My family could be better off if I left NAC.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. Working at NAC is about what I expected it would be	(1)	(2)	(3)	(4)	(5)	(6)	(7)
f. Pay raises/promotions depend on performance	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. Please answer the following:

a. The pay for my present job is:

(1) (2) (3) (4) (5) (6) (7)

less than I really need to live — enough to meet my needs — much more than my needs require

b. How important is pay to you?

(1) (2) (3) (4) (5) (6) (7)

unimportant — moderately important — important

c. Have you received other job offers in the past 12 months?

(0) ____ no
(1) ____ yes

d. How many more years do you intend to work at NAC?

____ <1
____ 1-3
____ 4-6
____ 7-9
____ 10-12
____ 13-15
____ 16+

CAREER DEVELOPMENT

This section asks you how you think and feel about various aspects concerning career development.

1. How satisfied are you with:	very dissatisfied	dissatisfied	slightly dissatisfied	not satisfied or dissatisfied	slightly satisfied	satisfied	very satisfied
a. the career options available to you	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. the career development program at NAC	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. the amount of information that is available to me concerning career paths	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. the availability of career guidance	(1)	(2)	(3)	(4)	(5)	(6)	(7)

2. Please answer the following:

a. to what extent do the career options available at NAC satisfy your career goals?

(1)	(2)	(3)	(4)	(5)	(6)	(7)
career options are inadequate to meet my needs		career options adequate to meet my needs			career options are more than adequate to meet my needs	

b. how familiar are you with the available career options?

(1)	(2)	(3)	(4)	(5)	(6)	(7)
I know little about my career options		I am fairly well informed about my career options			I am very well informed about my career options	

c. Rank the following in order of importance to you (1 = most important, 5 = least important):

My job/career at NAC appeals to me because it allows/ will allow me the opportunity to:

_____ develop and utilize technical skills
_____ develop and utilize managerial skills
_____ develop and utilize creative skills
_____ work in an autonomous setting
_____ have job security

3. The following section asks you questions concerning your knowledge and understanding of, and satisfaction with, your career options at NAC- program manager, line manager, systems engineer, and technical consultant/engineer. If you are already in a "track", then please answer the questions "in hindsight".

	not at all		some what		quite		extremely
a. How knowledgeable are/were you about the career options available to you at NAC?							
(1) program manager.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
b. How attainable is/was each career option for you?							
(1) program manager.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
c. How desirable is/was each career option for you?							
(1) program manager.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
d. To what extent is/was each career option able to satisfy your career aspirations?							
(1) program manager.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)
e. To what extent are/were you interested in pursuing a career in each option available to you at NAC?							
(1) program manager.	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(2) line manager	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(3) systems engineer	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(4) technical consultant . .	(1)	(2)	(3)	(4)	(5)	(6)	(7)

4. Please answer the following questions:

a. What factors do you consider to be the most important in selecting a career path option?

b. Which of the available career paths is most attractive, and why?

c. What improvements could be made in the career development process at NAC?

d. What are the most satisfying aspects of your job and working at NAC?

e. What are the least satisfying aspects of your job and working at NAC?

THANK YOU FOR YOUR COOPERATION IN SPENDING TIME TO ANSWER OUR QUESTIONS.

APPENDIX C

COMPUTER ANALYSIS RESULTS (MILITARY SAMPLE)

This appendix contains the computer programs and program results used in the analysis of the military samples. A copy of the program used for the analysis is presented first. This is followed by a table of variables, including mean values, a first-order correlation table, and a table of Logit regression results for each of the two military samples. In each case, the surface warfare community sample (n = 195) results are presented first, followed by the submarine community sample (n = 102) results.

```
1           DATA ONE;
2             SET OFFICER.OFFALL;
                        341
3             IF O3E3=2;      /*KEEP ONLY NAVY*/
4             KEEP O5E5 O6E6 O7E7 O27E26 O30E29 O32 O35E34
5             O36E35 O46 O51E48 O66E63 O67E64 O94E90 O95E91 O96E92
6             O97E93A-NUMERIC-O97E93M O106E102 O107E103 O108104A O108104D
7             O109105A-NUMERIC-O109105R O110E106;


WARNING 341: YOUR SERVICE AGREEMENT HAS EXPIRED.  PLEASE
      CONTACT YOUR COMPUTING INSTALLATION'S USER SERVICE
      PERSONNEL OR INSTALLATION SAS REPRESENTATIVE.

NOTE: DATA SET WORK.ONE HAS 3976 OBSERVATIONS AND 51 VARIABLES. 430 OBS/TRK.
NOTE: THE DATA STATEMENT USED 8.61 SECONDS AND 648K.

8           DATA TWO;
9             SET ONE;
10          IF O6E6>47 AND O6E6<148;              /*WANT THOSE WITH 4-12 YRS LOS*/
11          LOS=O6E6/12;

NOTE: DATA SET WORK.TWO HAS 1569 OBSERVATIONS AND 52 VARIABLES. 400 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.51 SECONDS AND 584K.

12          DATA THREE;
13            SET TWO;
14          IF O2E2=1;                                  /*WANT MALES ONLY*/
15          IF O5E5<14 THEN DELETE;                   /*WANT ONLY OFFICERS*/
16             IF O5E5=14 THEN PAYGR=1;
17             IF O5E5=15 THEN PAYGR=2;
18             IF O5E5=16 THEN PAYGR=3;
19             IF O5E5=17 THEN PAYGR=4;
20             IF O5E5=18 THEN PAYGR=5;
21             IF O5E5=19 THEN PAYGR=6;
22          IF O7E7=1110 OR O7E7=1115 OR O7E7=1160 OR O7E7=1165 OR O7E7=1120
23             OR O7E7=1125 OR O7E7 1170 OR O7E7=1175;


            DATA FOUR;
               SET THREE;
            IF O27E26<0 THEN O27E26=.;
               E[illegible]                          /*EXPECTED LOS WHEN QUIT*/
            IF O[illegible] THEN O30E29=.;
               IF O[illegible] THEN MARRIAGE=1;      /*MOTHANGED /SAIN*/
               E[illegible]                                  /*GOOD DUSTA BASE*/
            IF [illegible] O7E7 =0 OR O7E7 =8 THEN O32=.;
               IF O[illegible]=1;                    /*NOW
               E[illegible]                  /*EXPECT PROMO IS BASE*/
            IF O[illegible] THEN O35E34=.;
               [illegible]
            IF O[illegible]
            IF [illegible]                           /*JUST ONLY SOL FOR GRADS*/
            IF O[illegible]=1;                       /*[illegible]
               E[illegible]                          /*PROM EXP. IS BASE ED. O/OE*/
            IF O[illegible]
            IF O[illegible]=1;                       /*NOW
               E[illegible]                          /*ADDED ON MEMBERS CAREER IS BASE*/
            IF O[illegible]
               IF [illegible]=1;
                  E[illegible]                        /*NO JOB OFFER IN PAST YR IS BASE*/
            IF O[illegible]
               IF [illegible]=1;
                  E[illegible]                        /*NO LOOK FOR JOB PAST YR IS BASE*/
            IF O[illegible]
               IF O[illegible] THEN JOBALT=1;        /*NOW*/
               E[illegible]                          /*POOR ALT JOBS BASE*/
            IF O[illegible]=1 THEN O97E93AE.;
            IF O[illegible]=1 THEN O97E93BE.;
            IF O[illegible]=1 THEN O97E93CE.;
            IF O[illegible]=1 THEN O97E93DE.;
            IF O[illegible]=1 THEN O97E93EE.;
            IF O[illegible]=1 THEN O97E93FE.;
            IF O97E93AE=1 OR O97E93BE=1 OR O97E93CE=1 OR O97E93DE=1 OR O97E93EE=1
              OR O97E93FE=1 THEN WIFEWORK=1;       /*WIFE- FULL OR PARTTIME WORK*/
              ELSE WIFEWORK=0;                     /*WIFE NOT WORKING BASE*/
            IF O[illegible] THEN O106E102=.;
            IF O[illegible] THEN INCSAT=1;         /*NOW*/
               ELSE INCSAT=0;                      /*SAT W INC*/
            IF O[illegible]<0 THEN O107E103=.;
```

```
3          SAS(R) LOG   OS SAS 5.18          VS2/MVS JOB DAVIS    STEP SAS

65          IF 0107E103<4 THEN MORALE=1;          /*LOW MORALE*/
66             ELSE MORALE=0;                     /*HI MORALE IS BASE*/
67          IF 0108104A<0 THEN 0108104A=.;
68             IF 0108104A>3 THEN MILXPECT=1;      /*MIL LIFE AS EXP IS BASE*/
69             ELSE MILXPECT=0;
70          IF 0109104D<0 THEN 0108104D=.;
71            IF 0108104D<3 THEN BETOFF=1;          /*FAMILY BETOFF IF QUIT*/
72            ELSE BETOFF=0;
73          IF 0109105A<0 THEN 0109105A=.;
74             IF 0109105A>3 THEN FREEDOM=1;
75             ELSE FREEDOM=0;                     /*SAT IS BASE*/
76          IF 0109105B<0 THEN 0109105B=.;
77             IF 0109105B>3 THEN FRIENDS=1;
78             ELSE FRIENDS=0;                     /*SAT IS BASE*/
79          IF 0109105C<0 THEN 0109105C=.;
80             IF 0109105C>3 THEN COWRKERS=1;
81             ELSE COWRKERS=0;                    /*SAT IS BASE*/
82          IF 0109105D<0 THEN 0109105D=.;
83             IF 0109105D>3 THEN STABILE=1;
84             ELSE STABILE=0;                     /*SAT IS BASE*/
85          IF 0109105E<0 THEN 0109105E=.;
86             IF 0109105E>3 THEN PAYALLOW=1;
87             ELSE PAYALLOW=0;                    /*SAT IS BASE*/
88          IF 0109105F<0 THEN 0109105F=.;
89             IF 0109105F>3 THEN FAMENV=1;
90             ELSE FAMENV=0;                     /*SAT IS BASE*/
91          IF 0109105G<0 THEN 0109105G=.;
92             IF 0109105G>3 THEN MOVES=1;
93             ELSE MOVES=0;                      /*SAT IS BASE*/
94          IF 0109105H<0 THEN 0109105H=.;
95             IF 0109105H>3 THEN RETDEN=1;
96             ELSE RETDEN=0;                     /*SAT IS BASE*/
97          IF 0109105I<0 THEN 0109105I=.;
98             IF 0109105I>3 THEN PATRIOT=1;
99             ELSE PATRIOT=0;                    /*SAT IS BASE*/
100         IF 0109105J<0 THEN 0109105J=.;
101            IF 0109105J>3 THEN JOBSAT=1;
102            ELSE JOBSAT=0;                     /*SAT IS BASE*/
103         IF 0109105K<0 THEN 0109105K=.;
104            IF 0109105K>3 THEN FRIMOP=1;
105            ELSE FRIMOP=0;                     /*SAT IS BASE*/
106         IF 0109105L<0 THEN 0109105L=.;
107            IF 0109105L>3 THEN EDTRIN=1;
108            ELSE EDTRIN=0;                     /*SAT IS BASE*/
109         IF 0109105M<0 THEN 0109105M=.;
110            IF 0109105M>3 THEN JOBSEC=1;
111            ELSE JOBSEC=0;                    /*SAT IS BASE*/
112         IF 0109105N<0 THEN 0109105N=.;
113            IF 0109105N>3 THEN NAVENV=1;
114            ELSE NAVENV=0;                    /*SAT IS BASE*/
115         IF 0109105O<0 THEN 0109105O=.;
116            IF 0109105O>3 THEN NEAT=1;
117            ELSE NEAT=0;                     /*SAT IS BASE*/
118         IF 0109105P<0 THEN 0109105P=.;
119            IF 0109105P>3 THEN REDDEN=1;
120            ELSE REDDEN=0;                   /*SAT IS BASE*/
121         IF 0109105Q<0 THEN 0109105Q=.;
122            IF 0109105Q>3 THEN RENTAL=1;
123            ELSE RENTAL=0;                   /*SAT IS BASE*/
124         IF 0109105R<0 THEN 0109105R=.;
125            IF 0109105R>3 THEN COMENGH=1;
126            ELSE COMENGH=0;                  /*SAT IS BASE*/
127         IF 0110E10E>0 THEN 0110E10E=.;
128            IF 0110E10E>4 THEN SATMIL=1;        /*DISSAT W/MIL LIFE*/
129            ELSE SATMIL=0;
130         IF 0107H30Z   THEN MARRIED=1;
131           ELSE MARRIED=0;                    /*NOT MARRIED BASE*/
132         IF 0107E10Z>1 THEN DEP=1;
133           ELSE DEP=0;                        /*NO DEPENDENTS BASE*/
134         IF LOS>5 THEN LOS=4;
135         IF LOS>4.99 AND LOS<6 THEN LOS=5;
136         IF LOS>5.99 AND LOS<7 THEN LOS=6;
137         IF LOS>6.99 AND LOS<8 THEN LOS=7;
138         IF LOS>7.99 AND LOS<9 THEN LOS=8;
139         IF LOS>8.99 AND LOS<10 THEN LOS=9;
140         IF LOS>9.99 AND LOS<11 THEN LOS=10;
141         IF LOS>10.99 AND LOS<12 THEN LOS=11;
```

```
4          SAS(R) LOG   OS SAS 5.18          VS2/MVS JOB DAVIS    STEP SAS

142         IF LOS>11.99 AND LOS<13 THEN LOS=12;
143         IF LOS>12.99 AND LOS<14 THEN LOS=13;
144         IF LOS>13.99 THEN LOS=14;
145         IF Q27E26>19.99 THEN Y=1;
146             ELSE Y=0;                    /*CAREER INTENT IF EXPLOS>20*/

NOTE: DATA SET WORK.FOUR HAS 297 OBSERVATIONS AND 88 VARIABLES. 114 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.58 SECONDS AND 588K.

147         DATA FIVE;
148           SET FOUR;
149           DROP Q6E6 Q32 Q35E34 Q27E26 Q30E29 Q5E5
150           Q46 Q31E48 Q66E63 Q67E64 Q94E90 Q95E91 Q96E92
151           Q97E93A-NUMERIC-Q97E93H Q106E102 Q107E103 Q108104A Q108104D
152           Q109105A-NUMERIC-Q109105R Q110E106 PATRIOT PROMOP EDTRAIN JOBSEC
153           EXPLOS FRIENDS COWRKERS STABILE PAYALLOW RETDEN VEAP MOVES
154           MEDDEN DENTAL COMEXCH;

NOTE: DATA SET WORK.FIVE HAS 297 OBSERVATIONS AND 24 VARIABLES. 252 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.21 SECONDS AND 584K.

155         DATA SUB;
156            SET FIVE;
157            IF Q7E7=1120 OR Q7E7=1125 OR Q7E7=1170 OR Q7E7=1175;

NOTE: CHARACTER VALUES HAVE BEEN CONVERTED TO NUMERIC
      VALUES AT THE PLACES GIVEN BY: (LINE):(COLUMN).

      157:7  157:20  157:33  157:46

NOTE: DATA SET WORK.SUB HAS 102 OBSERVATIONS AND 24 VARIABLES. 252 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.16 SECONDS AND 580K.

158         DATA SUB1;
159            SET SUB;
160            DROP Q7E7;

NOTE: DATA SET WORK.SUB1 HAS 102 OBSERVATIONS AND 23 VARIABLES. 256 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.12 SECONDS AND 580K.

161         PROC LOGIST CT;
162            SUB: MODEL Y= LOS EXPFROMO JOBLOOK JOBALT MORALE MILXPECT FREEDOM
163                    FAMENV DEP MARRIED NXTDUDAD JOBSAT SATMIL DETOFF;

NOTE: LOGIST IS SUPPORTED BY THE AUTHOR, NOT BY SAS INSTITUTE INC.
NOTE: FRANK E. HARRELL, JR. AND DERCEDIS PETERSON          3/80
NOTE: CLINICAL BIOSTATISTICS
NOTE: BOX 3363, DUKE UNIVERSITY MEDICAL CENTER, DURHAM NC 27710
NOTE: THE PROCEDURE LOGIST USED 2.79 SECONDS AND 716K AND PRINTED PAGES 1 TO 2.

164         DATA SURFACE;
165           SET FIVE;
166           IF Q7E7=1110 OR Q7E7=1115 OR Q7E7=1160 OR Q7E7=1165;

NOTE: CHARACTER VALUES HAVE BEEN CONVERTED TO NUMERIC
      VALUES AT THE PLACES GIVEN BY: (LINE):(COLUMN).

      166:9  166:19  166:32  166:45

NOTE: DATA SET WORK.SURFACE HAS 195 OBSERVATIONS AND 24 VARIABLES. 252 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.16 SECONDS AND 580K.

167         DATA SURF1;
168           SET SURFACE;
169           DROP Q7E7;

NOTE: DATA SET WORK.SURF1 HAS 195 OBSERVATIONS AND 23 VARIABLES. 256 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.13 SECONDS AND 580K.

170         PROC LOGIST CT;
171           SURF: MODEL Y= LOS EXPFROMO JOBLOOK JOBALT MORALE CAREAGREE FREEDOM
172                   FAMENV DEP MARRIED NXTDUDAD JOBSAT SATMIL DETOFF WORKENV;

NOTE: LOGIST IS SUPPORTED BY THE AUTHOR, NOT BY SAS INSTITUTE INC.
NOTE: FRANK E. HARRELL, JR. AND DERCEDIS PETERSON          3/80
NOTE: CLINICAL BIOSTATISTICS
NOTE: BOX 3363, DUKE UNIVERSITY MEDICAL CENTER, DURHAM NC 27710
```

SAS

VARIABLE	N	MEAN	STD DEV	SUM
Y	195	0.70769231	0.45599366	138.00000000
AGE	195	29.77948718	3.44284552	5807.00000000
LOS	195	7.05128205	2.35451658	1375.00000000
PSYCH	195	2.85641026	0.83103304	557.00000000
HOSPADD	195	0.05128205	0.22114020	10.00000000
EMERGNCY	195	0.43589744	0.49715022	85.00000000
CURRED	195	0.11282051	0.31718761	22.00000000
CARACREE	195	0.17948718	0.38474753	35.00000000
JOBOFFER	195	0.40000000	0.49115695	78.00000000
JOBLOOK	195	0.15897436	0.36659336	31.00000000
JOBALT	195	0.54358974	0.49937841	106.00000000
LIFEWORK	195	0.32307692	0.46385556	63.00000000
INCSAT	195	0.38974359	0.48894736	76.00000000
MORALE	195	0.31794872	0.46687809	62.00000000
HELPECT	195	0.19487179	0.39712155	38.00000000
LETGLF	195	0.62564103	0.48520266	122.00000000
FREEDOM	195	0.28205128	0.45115647	55.00000000
FAMSAT	195	0.28717949	0.45361065	56.00000000
MOVED	195	0.37948718	0.48650843	74.00000000
JOBSAT	195	0.20512821	0.40403465	40.00000000
MARRIED	195	0.27179487	0.44602986	53.00000000
SATHIL	195	0.24102564	0.42830675	47.00000000
MARRIED	195	0.69230769	0.46272646	135.00000000
TEP	195	0.49743590	0.50128041	97.00000000

SAS

VARIABLE	N	MEAN	STD DEV	SUM
Y	102	0.52941176	0.50159907	54.00000000
AGE	102	28.54901961	3.10422086	2912.00000000
LOS	102	6.84313725	2.39744341	698.00000000
FAVOR	102	3.04901961	0.31298193	311.00000000
HANDBAD	102	0.02941176	0.16979209	3.00000000
EXPRONG	102	0.42156863	0.49624879	43.00000000
CURSED	102	0.08823529	0.28503747	9.00000000
CANCREE	102	0.20588235	0.40634169	21.00000000
JCHOFFER	102	0.48039216	0.50208264	49.00000000
JCBLOOK	102	0.18627451	0.39125065	19.00000000
JCSALT	102	0.73529412	0.44333513	75.00000000
WIFEWORK	102	0.28431373	0.45331455	29.00000000
INCEST	102	0.21568627	0.41332870	22.00000000
MORALE	102	0.29411765	0.45789521	30.00000000
WIFEPLOT	102	0.17647059	0.38310262	18.00000000
DEITOFF	102	0.52941176	0.50159907	54.00000000
FRELIGN	102	0.29411765	0.45789521	30.00000000
FAMILY	102	0.29411765	0.45789521	30.00000000
MARSEX	102	0.40196078	0.49271533	41.00000000
JCLOST	102	0.21568627	0.41332870	22.00000000
WORLDEV	102	0.31372549	0.46629766	32.00000000
SATIEL	102	0.27450980	0.44847073	28.00000000
MARRIED	102	0.70588235	0.45789521	72.00000000
LOP	102	0.44117647	0.49897974	45.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 195

	Y
AGE	0.27394 0.0001
LOS	0.23968 0.0007
PAYGR	0.20153 0.0047
NXTDUEAD	0.09830 0.1716
EXPPROMO	-0.41278 0.0001
CURRED	0.01535 0.8313
CARAGREE	0.15368 0.0319
JOBOFFER	0.06444 0.3708
JOBLOOK	-0.24479 0.0006
JOBALT	-0.15880 0.0266
WIFEWORK	0.05824 0.4187
INCSAT	-0.06438 0.3712
MORALE	-0.14229 0.0472
MILXFECT	-0.11080 0.1231
DETOFF	-0.24025 0.0007
FREEDOM	-0.27369 0.0001
FAMENV	-0.11540 0.1062
MOVES	-0.05505 0.4446
JOBSAT	-0.31574 0.0001
WORKENV	-0.34234 0.0001
SATMIL	-0.53413 0.0001
MARRIED	0.23114 0.0011
DEP	0.16303 0.0205
Y	1.00000 0.0000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 102

	Y
AGE	0.37105
AGE	0.0001
LOS	0.38229
	0.0001
PAYGR	0.25136
	0.0108
NXTDUEAD	-0.06838
	0.4946
EXPPROMO	-0.46795
	0.0001
CURRED	0.15479
	0.1203
CARAGREE	-0.00571
	0.9545
JOBOFFER	-0.03700
	0.7120
JOBLOOK	-0.25522
	0.0096
JOBALT	-0.16499
	0.0975
WIFEWORK	0.07172
	0.4733
INCSAT	-0.07866
	0.4320
MORALE	-0.21047
	0.0337
MILXPECT	-0.23737
	0.0162
DETOFF	-0.18056
	0.0694
FREEDOM	-0.33979
	0.0005
FAMENV	-0.29668
	0.0025
MOVES	-0.02822
	0.7778
JOBSAT	-0.22192
	0.0250
WORKENV	-0.08217
	0.4116
SATHIL	-0.38836
	0.0001
MARRIED	0.16726
	0.0927
DEP	0.24433
	0.0133
Y	1.00000
	0.0000

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: Y

195 OBSERVATIONS
57 Y = 0
138 Y = 1
0 OBSERVATIONS DELETED DUE TO MISSING VALUES

VARIABLE	MEAN	MINIMUM	MAXIMUM	S. D.
LOS	7.05128	4	12	2.35452
EXPPROMO	0.435897	0	1	0.49715
JOBLOOK	0.158974	0	1	0.366593
JOBALT	0.54359	0	1	0.499378
MORALE	0.317949	0	1	0.466878
CARAGREE	0.179487	0	1	0.384743
FREEDOM	0.282051	0	1	0.451156
FAMENV	0.287179	0	1	0.453611
DEP	0.497436	0	1	0.50128
MARRIED	0.692308	0	1	0.462726
NXTDUDAD	0.0512821	0	1	0.22114
JOBSAT	0.205128	0	1	0.404835
SATNIL	0.241026	0	1	0.428807
DETOFF	0.625641	0	1	0.485203
WORKENV	0.271795	0	1	0.44603

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY= 235.64

MODEL CHI-SQUARE= 100.77 WITH 15 D.F. (SCORE STAT.) P=0.0 .
CONVERGENCE IN 7 ITERATIONS WITH 0 STEP HALVINGS R= 0.632.
MAX ABSOLUTE DERIVATIVE=0.1154D-04. -2 LOG L= 111.65.
MODEL CHI-SQUARE= 123.99 WITH 15 D.F. (-2 LOG L.R.) P=0.0 .

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P	R
INTERCEPT	1.13819281	0.91502102	1.55	0.2135	
LOS	0.39601452	0.13275016	8.90	0.0029	0.171
EXPPROMO	-2.94083090	0.61122030	23.15	0.0000	-0.300
JOBLOOK	-0.20590950	0.67556337	0.09	0.7619	0.000
JOBALT	-1.03699113	0.54923053	3.56	0.0590	-0.081
MORALE	-0.01922259	0.61452431	0.00	0.9743	0.000
CARAGREE	0.45517529	0.79779114	0.30	0.5954	0.000
FREEDOM	0.10571427	0.60462590	0.09	0.7587	0.000
FAMENV	1.[illegible]	0.75317044	3.39	0.0654	0.077
DEP	0.[illegible]	0.62075870	0.82	0.3662	0.000
MARRIED	0.84009757	0.66750860	1.63	0.2012	0.000
NXTDUDAD	3.13900914	2.66622952	1.39	0.2391	0.000
JOBSAT	-0.79091140	0.67491633	1.30	0.2540	0.000
SATNIL	-3.51625330	0.80991544	18.85	0.0000	-0.267
DETOFF	-1.20413700	0.61115090	3.88	0.0483	-0.007
WORKENV	-0.19426137	0.66172736	0.09	0.7691	0.000

CLASSIFICATION TABLE

		PREDICTED NEGATIVE	PREDICTED POSITIVE	TOTAL
TRUE	NEGATIVE	46	11	57
	POSITIVE	8	130	138
	TOTAL	54	141	195

SENSITIVITY: 94.2% SPECIFICITY: 80.7% CORRECT: 90.3%
FALSE POSITIVE RATE: 7.8% FALSE NEGATIVE RATE: 14.8%

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: Y

102 OBSERVATIONS
48 Y = 0
54 Y = 1
0 OBSERVATIONS DELETED DUE TO MISSING VALUES

VARIABLE	MEAN	MINIMUM	MAXIMUM	S. D.
LOS	6.84314	4	12	2.39944
EXPPROMO	0.421569	0	1	0.496249
JOBLOOK	0.186275	0	1	0.391051
JOBALT	0.735294	0	1	0.443355
MORALE	0.294118	0	1	0.457895
MILXPECT	0.176471	0	1	0.383103
FREEDOM	0.294118	0	1	0.457895
FAMENV	0.294118	0	1	0.457895
DEP	0.441176	0	1	0.49898
MARRIED	0.705882	0	1	0.457895
NXTDUEAD	0.0294118	0	1	0.169792*
JOBSAT	0.215686	0	1	0.413329
SATMIL	0.27451	0	1	0.448471
DETOFF	0.529412	0	1	0.501599

* WARNING: VARIABLE HAS LIMITED DISPERSION.

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY= 141.05

MODEL CHI-SQUARE= 46.72 WITH 14 D.F. (SCORE STAT.) P=0.0000.
CONVERGENCE IN 6 ITERATIONS WITH 0 STEP HALVINGS R= 0.482.
MAX ABSOLUTE DERIVATIVE=0.40359-05. -2 LOG L= 80.27.
MODEL CHI-SQUARE= 60.78 WITH 14 D.F. (-2 LOG L.R.) P=0.0000.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P	R
INTERCEPT	-1.49039148	1.14703873	1.69	0.1938	
LOS	0.54204238	0.15887032	11.64	0.0006	0.261
EXPPROMO	-2.56844915	0.67072763	13.03	0.0002	-0.290
JOBLOOK	-0.37640814	0.93421777	0.16	0.6869	0.000
JOBALT	0.00850624	0.69955203	0.00	0.9903	0.000
MORALE	-0.90436610	0.75604775	1.43	0.2331	0.000
MILXPECT	0.19657960	1.02028335	0.04	0.8472	0.000
FREEDOM	-0.69303915	0.75003997	0.86	0.3549	0.000
FAMENV	-1.52207474	0.72915559	4.41	0.0356	-0.131
DEP	-0.20533346	0.79208799	0.11	0.7371	0.000
MARRIED	0.69449191	0.83923651	0.63	0.4203	0.000
NXTDUEAD	-4.02761400	1.87850421	4.60	0.0320	-0.136
JOBSAT	0.30964734	1.30967105	0.06	0.8131	0.000
SATMIL	-0.59952395	1.20731356	0.25	0.6195	0.000
DETOFF	-0.54462074	0.68439682	0.63	0.4263	0.000

CLASSIFICATION TABLE

		PREDICTED NEGATIVE	PREDICTED POSITIVE	TOTAL
TRUE	NEGATIVE	39	9	48
	POSITIVE	6	43	54
	TOTAL	45	57	102

SENSITIVITY: 88.9% SPECIFICITY: 81.3% CORRECT: 85.3%
FALSE POSITIVE RATE: 15.8% FALSE NEGATIVE RATE: 13.3%

APPENDIX D

COMPUTER ANALYSIS RESULTS (NAVAL AVIONICS SAMPLE)

This appendix contains the computer program and program results used in the analysis of the Naval Avionics Center sample. The data set for this program was created by the authors and entered using a CARDS statement in SAS. Eventually, these data will be available as a mass storage file under the cognizance of the thesis co-advisors. Following the copy of the program, a table of variables, including mean values, a first-order correlation table, and the results of the Logit regression are presented.

```
1          SAS(R) LOG   OS SAS 5.18          VS2/MVS JOB DAVIS    STEP SAS

NOTE: COPYRIGHT (C) 1984,1988 SAS INSTITUTE INC., CARY, N.C.  27512, U.S.A.
NOTE: THE JOB DAVIS HAS BEEN RUN UNDER RELEASE 5.18 OF SAS AT NAVAL POSTGRADUATE SCHOOL (06043001)

NOTE: CPUID   VERSION = 00  SERIAL = 021808  MODEL = 3033 .

NOTE: SAS OPTIONS SPECIFIED ARE:
      SORT=4

YOUR SERVICE AGREEMENT HAS EXPIRED FOR THE FOLLOWING PRODUCT(S):
             SAS
             SAS/ETS
PLEASE CONTACT YOUR COMPUTING INSTALLATION'S USER SERVICE
PERSONNEL OR INSTALLATION SAS REPRESENTATIVE.
(* - DENOTES EXPIRATION ERROR, OTHERWISE, EXPIRATION WARNING)

1          DATA ONE;
2            INPUT CASE GENDER AGE LOS ED MARRIED DEP DEPT PAYGR WIFEWORK JOBLOOK
3              JOBSAT BENSAT COWORK FREEDOM PAYSAT JOBSEC SATPROMO TRAIN BONUSSAT
4              JOBSEEK JOBALT EXPPROMO INTENT1 RETOFF INTENT2 MORALE WORKENV SATNAC
5              RETOFF2 NACXPECT PAYSAT2 JOBOFFER EXPLOS TECH MGMT CREAT AUTO SEC;
6            CARDS;

NOTE: SAS WENT TO A NEW LINE WHEN INPUT STATEMENT
      REACHED PAST THE END OF A LINE.
NOTE: DATA SET WORK.ONE HAS 169 OBSERVATIONS AND 39 VARIABLES. 148 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.27 SECONDS AND 580K.

345        ;
346        DATA TWO;
347          SET ONE;
                 341
348           IF GENDER=1;                          /*MALES ONLY*/
349           IF LOS>1 AND LOS<13;                  /*2 TO 12 YRS LOS*/

WARNING 341: YOUR SERVICE AGREEMENT HAS EXPIRED.  PLEASE
      CONTACT YOUR COMPUTING INSTALLATION'S USER SERVICE
      PERSONNEL OR INSTALLATION SAS REPRESENTATIVE.

NOTE: DATA SET WORK.TWO HAS 136 OBSERVATIONS AND 39 VARIABLES. 148 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.11 SECONDS AND 580K.

359        DATA THREE;
360          SET TWO;
361          IF ED>3 THEN ED=1;
362             ELSE ED=0;                         /*MASTERS OR DOCTORATE*/
363          IF WIFEWORK=3 THEN WIFEWORK=.;        /*RECODE NA RESPONSE*/
364          IF JOBSAT<4 THEN JOBSAT=1;
365             ELSE JOBSAT=0;                     /*SAT W JOB IS BASE*/
366          IF BENSAT<4 THEN BENSAT=1;
367             ELSE BENSAT=0;                     /*SAT W BEN IS BASE*/
368          IF COWORK<4 THEN COWORK=1;
369             ELSE COWORK=0;                     /*SAT W COWORK BASE*/
370          IF FREEDOM<4 THEN FREEDOM=1;
371             ELSE FREEDOM=0;                    /*SAT W FREEDOM IS BASE*/
372          IF PAYSAT<4 THEN PAYSAT=1;
373             ELSE PAYSAT=0;                     /*SAT W PAY IS BASE*/
374          IF JOBSEC<4 THEN JOBSEC=1;
375             ELSE JOBSEC=0;                     /*SAT W JOBSEC BASE*/
376          IF SATPROMO<4 THEN SATPROMO=1;
377             ELSE SATPROMO=0;                   /*SAT W PROMO IS BASE*/
378          IF TRAIN<4 THEN TRAIN=1;
379             ELSE TRAIN=0;                      /*SAT W TRAINING IS BASE*/
380          IF BONUSSAT<4 THEN BONUSSAT=1;
381             ELSE BONUSSAT=0;                   /*SAT W BONUS BASE*/
382          IF JOBALT>3 THEN JOBALT=1;
383             ELSE JOBALT=0;                     /*POOR JOBALT IS BASE*/
384          IF EXPPROMO<4 THEN EXPPROMO=1;
385             ELSE EXPPROMO=0;                   /*EXPECT PROMO IS BASE*/
386          IF RETOFF>3 THEN RETOFF=1;
387             ELSE RETOFF=0;                     /*FAN RETTOFF IF QUIT*/
388          IF INTENT2>3 THEN CAREER=1;
389             ELSE CAREER=0;                     /*NONCAREERIST IS BASE*/
390          IF MORALE<4 THEN MORALE=1;
391             ELSE MORALE=0;                     /*HI MORALE IS BASE*/
392          IF WORKENV<4 THEN WORKENV=1;
393             ELSE WORKENV=0;                    /*SAT WORKENV IS BASE*/
```

```
2          SAS(R) LOG   OS SAS 5.18          VS2/MVS JOB DAVIS    STEP SAS

385           IF SATNAC<4 THEN SATNAC=1;
386              ELSE SATNAC=0;                    /*SAT W NAC LIFE BASE*/
387           IF DETOFF2>4 THEN DETOFF2=1;
388              ELSE DETOFF2=0;                   /*DETOFF IF QUIT*/
389           IF NACXPECT<4 THEN NACXPECT=1;
390              ELSE NACXPECT=0;                  /*NAC AS EXP IS BASE*/
391           IF JOBOFFER=3 THEN JOBOFFER=1;
392         TOTLOS=EXPLOS+LOS;
393         AGELOS=AGE+EXPLOS;
394         IF EXPLOS>12 OR TOTLOS>20 OR AGELOS>55 THEN LIFER=1;
395           ELSE LIFER=0;

NOTE: MISSING VALUES WERE GENERATED AS A RESULT OF PERFORMING
      AN OPERATION ON MISSING VALUES.
      EACH PLACE IS GIVEN BY: (NUMBER OF TIMES) AT (LINE):(COLUMN).

      3 AT 392:8   3 AT 393:8

NOTE: DATA SET WORK.THREE HAS 136 OBSERVATIONS AND 43 VARIABLES. 134 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.23 SECONDS AND 584K.

396         DATA FOUR;
397           SET THREE;
398           DROP PAYSAT2 INTENT1 CASE GENDER INTENT2 JOBSEEK;

NOTE: DATA SET WORK.FOUR HAS 136 OBSERVATIONS AND 37 VARIABLES. 156 OBS/TRK.
NOTE: THE DATA STATEMENT USED 0.12 SECONDS AND 580K.

399         PROC CORR;
400           VAR LIFER;
401           WITH _ALL_;
NOTE: THE PROCEDURE CORR USED 0.22 SECONDS AND 640K AND PRINTED PAGES 1 TO 4.

402         PROC LOGIST CT;
403          MODEL LIFER=LOS AGE JOBLOOK JOBSAT JOBALT DETOFF MORALE SATNAC DEP
404                    DETOFF2 NACXPECT JOBOFFER;   /*NAC SPECIFIC*/

NOTE: LOGIST IS SUPPORTED BY THE AUTHOR. NOT BY SAS INSTITUTE INC.
NOTE: FRANK E. HARRELL, JR. AND BERCEDIS PETERSON          3/88
NOTE: CLINICAL BIOSTATISTICS
NOTE: BOX 3363, DUKE UNIVERSITY MEDICAL CENTER, DURHAM NC 27710
NOTE: THE PROCEDURE LOGIST USED 3.29 SECONDS AND 715K AND PRINTED PAGE 5.
NOTE: SAS USED 715K MEMORY.

NOTE: SAS INSTITUTE INC.
      SAS CIRCLE
      PO BOX 8000
      CARY, N.C. 27512-8000
```

SAS

VARIABLE	N	MEAN	STD DEV	SUM
LIFER	136	0.22794118	0.42105532	31.00000000
AGE	136	32.30882353	7.23316913	4394.00000000
LOS	136	5.72058824	2.81712009	778.00000000
RAC	136	0.12500000	0.33194154	17.00000000
MARRIED	136	0.66176471	0.47485003	90.00000000
SEX	136	0.48529412	0.50163133	66.00000000
COUNT	136	6.64705882	2.46915614	904.00000000
PRIOR	136	11.52941176	0.60756724	1568.00000000
WTFRWORK	91	0.70329670	0.45933540	64.00000000
JOBLOOK	136	0.20588235	0.40583972	28.00000000
JOBSAT	136	0.23529412	0.42575065	32.00000000
DRUGSAT	136	0.38235294	0.48775965	52.00000000
GOODWRK	136	0.07352941	0.26196842	10.00000000
FREEDOM	136	0.06617647	0.24950932	9.00000000
PAYSAT	136	0.57352941	0.49639221	78.00000000
JOBSEC	136	0.00735294	0.08574929	1.00000000
SATPROMO	136	0.52205882	0.50135981	71.00000000
TRAIN	136	0.27941176	0.45036901	38.00000000
FRNDSAT	136	0.57352941	0.49639221	78.00000000
JOBALT	136	0.33088235	0.47227028	45.00000000
ALTPROMO	136	0.71323529	0.45392263	97.00000000
RETIRE	136	0.33088235	0.47227028	45.00000000
MORALE	136	0.56617647	0.49743350	77.00000000
WORKENV	136	0.49264706	0.50179417	67.00000000
NOTHING	136	0.41911765	0.49523877	57.00000000
DEFICNCY	136	0.38970588	0.48948641	53.00000000
INCORRECT	136	0.39705882	0.49109721	54.00000000
OTHERWIR	136	0.35294118	0.47965129	48.00000000
COMPLOS	136	6.80882941	5.09602484	929.00000000
TOTAL	1	2.27941940	1.16587952	305.00000000
MALE	136	3.40882507	1.40417960	456.00000000
COUNT	136	2.72500000	1.25291714	365.00000000
AGE	136	3.47761194	1.37494453	466.00000000
SEX	136	2.80740741	1.41683006	379.00000000
OTHER	136	0.19117647	0.39468142	26.00000000
TOTLOS	133	12.66917293	6.36482022	1685.00000000
AGELOS	133	39.37593985	9.44569928	5237.00000000

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	LIFER
AGE	0.41208 0.0001 136
LOS	0.28515 0.0008 136
ED	0.00662 0.9390 136
MARRIED	0.12912 0.1361 136
DEP	0.17361 0.0433 136
DEPT	0.07705 0.3670 136
PAYOR	0.14002 0.1078 136
WIFEJOB	0.00011 0.9991 91
JOBLOC	-0.10007 0.2481 136
JOBSAT	-0.13110 0.1241 136
DENSAT	0.00259 0.9511 136
COWORK	-0.15307 0.0752 136
FREEDOM	0.06600 0.4392 136
PAYSAT	0.04306 0.6170 136
JOBSEC	-0.04676 0.5895 136
SATPROMO	-0.04154 0.6311 136
TRAIN	-0.14364 0.0967 136
CONDOSAT	-0.06706 0.4431 136

PEARSON CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	LIFER
JOBALT	-0.30759 0.0003 136
EXPPROMO	-0.04303 0.6109 136
DETOFF	-0.19584 0.0223 135
MORALE	-0.25707 0.0017 136
WORKENV	-0.0[illegible]4 0.9[illegible] 135
SATNAC	-0.25342 0.0[illegible] 135
DETOFF2	-0.2[illegible] 0.0[illegible] 13[illegible]
NACXFECT	-0.1[illegible] 0.0[illegible] 135
JOBOFFER	-0.21791 [illegible] 135
EXPLOS	0.81[illegible] 0.0[illegible] 133
TECH	0.00671 0.[illegible] 134
MGMT	0.01917 0.8[illegible] 134
CREAT	0.09[illegible] 0.2[illegible] 134
AUTO	-0.0[illegible]01 0.3[illegible] 134
SEC	-0.03750 0.66[illegible]4 135
CAREER	0.62731 0.0001 13[illegible]
TOTLOS	0.78[illegible]0 0.0[illegible] 133
ACELOS	0.75470 0.0[illegible] 133

LOGISTIC REGRESSION PROCEDURE

DEPENDENT VARIABLE: LIFER

136 OBSERVATIONS
105 LIFER = 0
31 LIFER = 1
0 OBSERVATIONS DELETED DUE TO MISSING VALUES

VARIABLE	MEAN	MINIMUM	MAXIMUM	S. D.
LOS	5.72059	2	12	2.81712
AGE	32.3088	24	63	7.23317
JOBLOOK	0.205882	0	1	0.40584
JOBSAT	0.235294	0	1	0.425751
JOBALT	0.330882	0	1	0.47227
DETOFF	0.330882	0	1	0.47227
MORALE	0.566176	0	1	0.497434
SATNAC	0.419118	0	1	0.495239
DEP	0.485294	0	1	0.501631
DETOFF2	0.389706	0	1	0.489486
NACXPECT	0.397059	0	1	0.491097
JOBOFFER	0.352941	0	1	0.479651

-2 LOG LIKELIHOOD FOR MODEL CONTAINING INTERCEPT ONLY= 146.00

MODEL CHI-SQUARE= 49.02 WITH 12 D.F. (SCORE STAT.) P=0.0000.
CONVERGENCE IN 7 ITERATIONS WITH 0 STEP HALVINGS R= 0.503.
MAX ABSOLUTE DERIVATIVE=0.9211D-05. -2 LOG L= 85.00.
MODEL CHI-SQUARE= 61.00 WITH 12 D.F. (-2 LOG L.R.) P=0.0000.

VARIABLE	BETA	STD. ERROR	CHI-SQUARE	P	R
INTERCEPT	-5.93939304	1.63758824	13.15	0.0003	
LOS	0.17403672	0.10495096	2.75	0.0973	0.072
AGE	0.14388219	0.04551591	9.99	0.0016	0.234
JOBLOOK	-0.57920115	1.00700387	0.33	0.5655	0.000
JOBSAT	0.34264125	0.97286324	0.13	0.7198	0.000
JOBALT	-1.99338109	1.10655683	3.16	0.0754	-0.089
DETOFF	1.60617739	1.33855077	1.44	0.2267	0.000
MORALE	-0.02269158	0.61035214	0.00	0.9703	0.000
SATNAC	-2.11142499	0.87902910	5.76	0.0164	-0.160
DEP	0.92051322	0.57215035	2.59	0.1083	0.063
DETOFF2	-2.10533809	1.25967160	3.05	0.0806	-0.085
NACXPECT	-0.71041882	0.62259134	1.30	0.2546	0.000
JOBOFFER	-1.31403993	0.68754918	3.63	0.0566	-0.106

CLASSIFICATION TABLE

		PREDICTED NEGATIVE	PREDICTED POSITIVE	TOTAL
TRUE	NEGATIVE	100	5	105
	POSITIVE	12	19	31
	TOTAL	112	24	136

SENSITIVITY: 61.3% SPECIFICITY: 95.2% CORRECT: 87.5%
FALSE POSITIVE RATE: 20.8% FALSE NEGATIVE RATE: 10.7%

C=0.902 SOMER DYX=0.803 GAMMA=0.804 TAU-A=0.285

APPENDIX E

RESULTS OF COLLINEARITY DIAGNOSTICS BY SAMPLE

This appendix contains the results of the multicollinearity diagnostics run on each sample. The results were obtained by using the variables determined significant in correlation analysis as explanatory variables in an ordinary least squares regression, and programming for collinearity tables. The surface warfare community sample is presented first, followed by the submarine community sample, and finally, the Naval Avionics Center sample.

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	12	8.27693504	0.69141542	5.439	0.0001
ERROR	123	15.63639849	0.12712377		
C TOTAL	135	23.91333353			

ROOT MSE	0.3565512	R-SQUARE	0.3467
DEP MEAN	0.2279412	ADJ R-SQ	0.2829
C.V.	156.4225		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|
INTERCEP	1	-0.62811835	0.27457361	-2.288	0.0239
LOS	1	0.02309853	0.01183143	1.952	0.0532
AGE	1	0.01762627	0.004874589	3.616	0.0004
JOBLOOK	1	-0.03998413	0.08251631	-0.452	0.6523
JOBSAT	1	-0.001699730	0.02759376	-0.062	0.9510
JOBALT	1	-0.03250759	0.03586395	-0.906	0.3665
BETOFF	1	0.03083966	0.06117773	0.504	0.6151
MORALE	1	0.02441957	0.03006430	0.812	0.4182
SATNAC	1	0.04274694	0.03276721	1.305	0.1945
DEP	1	0.06068333	0.06464811	0.935	0.3265
BETOFF2	1	-0.03360933	0.04177631	-0.805	0.4227
NACXPECT	1	0.01664941	0.02346816	0.709	0.4794
JOBOFFER	1	-0.09269047	0.06230486	-1.584	0.1158

COLLINEARITY DIAGNOSTICS

NUMBER	EIGENVALUE	CONDITION NUMBER	VAR PROP INTERCEP	VAR PROP LOS	VAR PROP AGE	VAR PROP JOBLOOK	VAR PROP JOBSAT	VAR PROP JOBALT	VAR PROP BETOFF	VAR PROP MORALE	VAR PROP SATNAC	VAR PROP DEP
1	10.181511	1.000000	0.0001	0.0013	0.0003	0.0014	0.0004	0.0006	0.0002	0.0007	0.0004	0.0024
2	0.990897	3.205471	0.0000	0.0018	0.0002	0.3413	0.0010	0.0017	0.0000	0.0024	0.0021	0.0025
3	0.552967	4.290979	0.0000	0.0017	0.0000	0.1314	0.0015	0.0009	0.0000	0.0008	0.0010	0.2572
4	0.446314	4.776223	0.0002	0.0011	0.0002	0.0920	0.0006	0.0019	0.0009	0.0000	0.0000	0.6359
5	0.311017	5.714207	0.0001	0.0002	0.0000	0.2456	0.0080	0.0339	0.0110	0.0160	0.0212	0.0008
6	0.203207	7.070424	0.0000	0.6545	0.0034	0.0006	0.0042	0.0092	0.0014	0.0122	0.0044	0.0166
7	0.038332	10.702779	0.0001	0.0033	0.0411	0.0001	0.0337	0.0463	0.0033	0.4728	0.0131	0.0345
8	0.079339	11.320254	0.0001	0.0000	0.0078	0.0707	0.0827	0.0624	0.0090	0.0005	0.0627	0.0018
9	0.050393	14.213403	0.0018	0.0000	0.0033	0.0617	0.1403	0.5741	0.0462	0.1895	0.0131	0.0031
10	0.040055	15.706274	0.0172	0.2991	0.5605	0.0035	0.0030	0.1792	0.0002	0.1886	0.0240	0.0000
11	0.030330	18.321967	0.0018	0.0031	0.0119	0.0016	0.6373	0.0282	0.0008	0.1015	0.7762	0.0272
12	0.013435	27.528475	0.0917	0.0000	0.0015	0.0001	0.0099	0.0001	0.9097	0.0001	0.0005	0.0115
13	0.010377	31.324027	0.9759	0.0187	0.3696	0.0001	0.0775	0.0565	0.0116	0.0149	0.0814	0.0074

NUMBER	VAR PROP BETOFF2	VAR PROP NACXPECT	VAR PROP JOBOFFER
1	0.0002	0.0008	0.0022
2	0.0000	0.0009	0.1542
3	0.0000	0.0013	0.6271
4	0.0016	0.0011	0.3007
5	0.0153	0.0239	0.0023
6	0.0016	0.0109	0.0023
7	0.0080	0.1610	0.0000
8	0.0006	0.6974	0.0017
9	0.0740	0.0525	0.0143
10	0.0002	0.0103	0.0007
11	0.0006	0.0160	0.0009
12	0.8399	0.0000	0.0067
13	0.0493	0.0229	0.0023

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	14	4.36338400	0.31167029	1.771	0.0636
ERROR	53	9.32779247	0.17599608		
C TOTAL	67	13.69117647			

ROOT MSE	0.4195189	R-SQUARE	0.3187
DEP MEAN	0.7205882	ADJ R-SQ	0.1387
C.V.	58.21895		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	VARIABLE LABEL
INTERCEP	1	-0.04596167	1.05515889	-0.044	0.9654	INTERCEPT
030E29	1	-0.03124973	0.02766117	-1.130	0.2637	UNDESIRABLE LOCALE
032	1	0.04070205	0.03490830	1.166	0.2488	CHANCE OF PROMOTION
095E91	1	-0.07902192	0.19828637	-0.399	0.6918	LOOK FOR CIVILIAN JOB
096E92	1	-0.02432112	0.04727264	-0.514	0.6091	GOOD CIVILIAN JOB
0107E103	1	0.06230109	0.05497547	1.133	0.2622	DESCRIBE MORALE
0108104A	1	0.002096672	0.07425812	0.028	0.9776	LIFE IN MILITARY
0108104D	1	0.02200169	0.07531539	0.292	0.7713	CIVILIAN JOB
0109105A	1	-0.02749397	0.06559503	-0.419	0.6768	PERSONAL FREEDOM
0109105F	1	-0.09326852	0.06582274	-1.417	0.1623	FAMILY ENVIRONMENT
067E64	1	0.01972625	0.06333960	0.269	0.7740	NUMBER OF DEPENDENTS
051E48	1	0.01721065	0.03136702	0.549	0.5855	PRESENT MARITAL STATE
0109105J	1	0.05056290	0.08159408	0.620	0.5381	HAPPY WITH JOB
0110E106	1	0.004176789	0.07155493	0.058	0.9537	MILITARY LIFE
LOS	1	0.08594145	0.02513812	3.419	0.0012	

COLLINEARITY DIAGNOSTICS

NUMBER	EIGENVALUE	CONDITION NUMBER	VAR PROP INTERCEP	VAR PROP 030E29	VAR PROP 032	VAR PROP 095E91	VAR PROP 096E92	VAR PROP 0107E103	VAR PROP 0108104A	VAR PROP 0108104D	VAR PROP 0109105A	VAR PROP 0109105F
1	13.225830	1.000000	0.0000	0.0006	0.0001	0.0001	0.0001	0.0002	0.0004	0.0003	0.0004	0.0003
2	0.588308	4.741426	0.0000	0.0022	0.0000	0.0002	0.0000	0.0003	0.0018	0.0012	0.0035	0.0004
3	0.378289	5.912887	0.0000	0.0389	0.0002	0.0012	0.0002	0.0071	0.0166	0.0118	0.0269	0.0041
4	0.216418	7.817444	0.0000	0.2242	0.0005	0.0002	0.0003	0.0274	0.0165	0.0073	0.0022	0.0083
5	0.137701	9.800386	0.0001	0.2752	0.0027	0.0029	0.0005	0.0002	0.0209	0.0178	0.0047	0.1156
6	0.104162	11.268250	0.0000	0.0126	0.0034	0.0007	0.0009	0.0093	0.0423	0.0558	0.2474	0.0879
7	0.087424	12.299748	0.0002	0.0888	0.0058	0.0002	0.0042	0.0245	0.0571	0.0383	0.0367	0.1105
8	0.071809	13.571329	0.0002	0.0862	0.0016	0.0000	0.0071	0.0162	0.2654	0.3629	0.1958	0.0357
9	0.062063	14.598085	0.0000	0.0027	0.0033	0.0015	0.0021	0.0011	0.3354	0.0312	0.0771	0.1650
10	0.051078	16.091437	0.0000	0.0003	0.0191	0.0006	0.0024	0.0090	0.1414	0.2787	0.0967	0.1145
11	0.026725	22.246078	0.0005	0.2262	0.0017	0.1105	0.0055	0.6333	0.0048	0.0246	0.0001	0.0706
12	0.023743	23.601730	0.0002	0.0067	0.5542	0.0784	0.0105	0.0828	0.1084	0.0261	0.1030	0.0540
13	0.014180	30.540479	0.0006	0.0154	0.0113	0.6848	0.0115	0.0343	0.0008	0.0201	0.0664	0.1492
14	0.010201	36.007048	0.0004	0.0001	0.2441	0.0681	0.7867	0.0316	0.0133	0.0548	0.0032	0.0021
15	0.0020693	79.945702	0.9978	0.0200	0.1516	0.0304	0.1621	0.0318	0.0350	0.0690	0.1358	0.0817

NUMBER	VAR PROP 067E64	VAR PROP 051E48	VAR PROP 0109105J	VAR PROP 0110E106	VAR PROP LOS
1	0.0005	0.0009	0.0003	0.0001	0.0003
2	0.0470	0.3146	0.0001	0.0002	0.0048
3	0.0008	0.0823	0.0340	0.0064	0.0000
4	0.0988	0.0973	0.0245	0.0007	0.0008
5	0.1948	0.0756	0.0005	0.0001	0.0352
6	0.0124	0.0161	0.1184	0.0039	0.0397
7	0.1147	0.2583	0.0217	0.0037	0.2153
8	0.0191	0.0168	0.0132	0.0032	0.0072
9	0.0015	0.0001	0.3142	0.0000	0.1249
10	0.3880	0.0170	0.0344	0.0016	0.3360
11	0.1056	0.0831	0.0093	0.1402	0.0139
12	0.0127	0.0151	0.0039	0.0396	0.0411
13	0.0015	0.0120	0.0051	0.4431	0.0191
14	0.0014	0.0016	0.2139	0.0622	0.0145
15	0.0012	0.0026	0.2065	0.2949	0.1472

ANALYSIS OF VARIANCE

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB>F
MODEL	15	2.03592146	0.13506143	2.309	0.0078
ERROR	92	5.51148594	0.05991833		
C TOTAL	107	7.54740741			

ROOT MSE	0.2418562	R-SQUARE	0.2715
DEP MEAN	0.6256259	ADJ R-SQ	0.1538
C.V.	38.12047		

PARAMETER ESTIMATES

VARIABLE	DF	PARAMETER ESTIMATE	STANDARD ERROR	T FOR H0: PARAMETER=0	PROB > |T|	VARIABLE LABEL
INTERCEP	1	0.48417749	0.35286804	1.372	0.1734	INTERCEPT
030E29	1	0.01134141	0.01084868	1.047	0.2985	UNDESIRABLE LOCALE
032	1	0.01114871	0.01104818	1.017	0.3116	CHANCE OF PROMOTION
095E91	1	0.09217042	0.05195496	1.774	0.0794	LOOK FOR CIVILIAN JOB
096E92	1	-0.03283779	0.01463721	-2.243	0.0272	GOOD CIVILIAN JOB
0107E103	1	-0.03101969	0.02136052	-1.452	0.1499	DESPISE MORALE
0109105N	1	-0.05294036	0.03568824	-1.483	0.1413	WORK CONDITIONS
0108104D	1	0.03276990	0.02569497	1.276	0.2054	CIVILIAN JOB
0109105A	1	0.04741065	0.03102724	1.528	0.1299	PERSONAL FREEDOM
0109105F	1	0.02560243	0.02796355	0.916	0.3617	FAMILY ENVIRONMENT
067E64	1	-0.02242553	0.02310020	-0.971	0.3299	NUMBER OF DEPENDENTS
051E48	1	-0.01074451	0.05615955	-0.191	0.8487	PRESENT MARITAL STATE
0109105J	1	-0.06625560	0.02705052	-2.451	0.0161	HIGH WITH JOB
0110E106	1	0.05993896	0.02450842	2.323	0.0224	MILITARY LIFE
LOS	1	0.02772601	0.01111523	2.495	0.0355	
096E63	1	0.02250980	0.03183759	0.707	0.4813	YOUR CAREER AGREENT

COLLINEARITY DIAGNOSTICS

NUMBER	EIGENVALUE	CONDITION NUMBER	VAR PROP INTERCEP	VAR PROP 030E29	VAR PROP 032	VAR PROP 095E91	VAR PROP 096E92	VAR PROP 0107E103	VAR PROP 0109105N	VAR PROP 0108104D	VAR PROP 0109105A	VAR PROP 0109105F
1	14.312066	1.000000	0.0000	0.0007	0.0012	0.0001	0.0001	0.0002	0.0003	0.0005	0.0003	0.0003
2	0.462621	5.962154	0.0001	0.0590	0.0015	0.0003	0.0002	0.0133	0.0088	0.0494	0.0079	0.0096
3	0.223145	8.003522	0.0000	0.2755	0.0031	0.0013	0.0060	0.0016	0.0051	0.0087	0.0554	0.0064
4	0.189514	8.713231	0.0000	0.2456	0.0001	0.0001	0.0004	0.0163	0.0025	0.0151	0.0194	0.0002
5	0.162526	9.384076	0.0000	0.0116	0.0009	0.0006	0.0009	0.0175	0.0007	0.1254	0.0193	0.0455
6	0.148569	9.813618	0.0000	0.0014	0.0000	0.0013	0.0040	0.0002	0.0022	0.0181	0.0039	0.0068
7	0.122355	10.815349	0.0002	0.0093	0.0069	0.0015	0.0044	0.0341	0.0798	0.4561	0.0016	0.0017
8	0.097338	12.091669	0.0000	0.1685	0.0020	0.0002	0.0014	0.0005	0.0241	0.0029	0.2965	0.0771
9	0.090953	12.544222	0.0000	0.0270	0.0488	0.0091	0.0018	0.0026	0.0031	0.0220	0.0009	0.3723
10	0.077880	13.555235	0.0001	0.0201	0.0007	0.0014	0.0195	0.0527	0.1613	0.0669	0.1194	0.0271
11	0.058297	15.668507	0.0002	0.0003	0.0985	0.0033	0.0122	0.0476	0.0028	0.1050	0.0609	0.1486
12	0.035029	20.215817	0.0002	0.1220	0.2681	0.0009	0.0023	0.4818	0.4768	0.0415	0.0531	0.0140
13	0.029321	21.870633	0.0000	0.0241	0.0316	0.0005	0.4269	0.0511	0.0104	0.0371	0.0555	0.0279
14	0.028116	22.561773	0.0015	0.0048	0.5199	0.0397	0.2542	0.1376	0.0450	0.0074	0.0563	0.1164
15	0.018167	28.068111	0.0004	0.0278	0.0180	0.8150	0.0003	0.0004	0.0144	0.0152	0.1512	0.1166
16	0.0039124	60.482717	0.9972	0.0062	0.0099	0.0382	0.2284	0.1367	0.0527	0.0286	0.0985	0.0297

NUMBER	VAR PROP 067E64	VAR PROP 051E48	VAR PROP 0109105J	VAR PROP 0110E106	VAR PROP LOS	VAR PROP 096E63
1	0.0007	0.0005	0.0005	0.0001	0.0003	0.0005
2	0.0000	0.0070	0.0257	0.0065	0.0037	0.0573
3	0.1452	0.0141	0.0808	0.0000	0.0016	0.0052
4	0.3813	0.0410	0.0151	0.0054	0.0046	0.0008
5	0.1804	0.1605	0.1627	0.0000	0.0028	0.0648
6	0.0019	0.2142	0.3316	0.0014	0.0011	0.2118
7	0.0324	0.1118	0.0369	0.0056	0.0105	0.0614
8	0.0021	0.0244	0.0440	0.0052	0.0000	0.2455
9	0.0364	0.1745	0.0054	0.0014	0.1075	0.1141
10	0.0820	0.0398	0.0051	0.0001	0.2260	0.1053
11	0.0319	0.0262	0.0008	0.1110	0.2452	0.0013
12	0.0044	0.0379	0.0422	0.0000	0.0495	0.0009
13	0.0027	0.0011	0.0321	0.2413	0.0153	0.0095
14	0.0008	0.0001	0.0092	0.0684	0.1227	0.1087
15	0.0052	0.1191	0.0222	0.3003	0.1481	0.0090

NUMBER	VAR PROP 0078E64	VAR PROP 0081E4C	VAR PROP 0109105J	VAR PROP 0110E106	VAR PROP LOS	VAR PROP 066E63
16	0.0227	0.0217	0.1847	0.2532	0.0557	0.0097

LIST OF REFERENCES

1. Air Force Human Relations Laboratory Technical Paper 82-2, Bibliography of Military and Non-military Personnel Turnover Literature, by G.A. Berry, C.N. Weaver, T.W. Watson, and K. Finstuon, November 1982.

2. Department of Defense Military Manpower Training Report for FY 1990, March 1989.

3. Eitelberg, M.J., Laurence, J.H., and Brown, D.C., Becoming Brass, University of California-Berkeley Press, 1989.

4. Naval Personnel Research and Development Center Technical Report, Human Individual Differences in Military Systems, by B. Rimland, April 1983.

5. Fawcett, C., and Skelton, S., A Comparative Analysis Between Retention of Junior Officers in the Navy and Junior Executives in Industry, Master's Thesis, Naval Postgraduate School, Monterey, California, 1964.

6. Naval Avionics Center Organization Manual, NAC Instruction 5450.14D, Naval Avionics Center, Indianapolis, Indiana, 1 April 1988.

7. Kuzmits, Frank E., "Job Satisfaction: Its Meaning and Measurement," Experiential Exercises in Personnel/Human Resource Management, 2nd ed., Merrill Publishing Co., 1987.

8. Muchinsky, P.M., Psychology Applied To Work, 2nd ed., Dorsey Press, 1987.

9. Hulin, C.L., "Effects of Changes in Job Satisfaction Levels on Employee Turnover," Journal of Applied Psychology, V. 52, No. 2, pp. 122-126, 1968.

10. Hom, P.W., Katerberg, R., and Hulin, C.L., "Comparative Examination of Three Turnover Approaches to the Prediction of Turnover," Journal of Applied Psychology, V. 64, No. 3, pp. 280-290, 1979.

11. Steers, R.M., "Antecedents and Outcomes of Organizational Commitment," Administrative Science Quarterly, V. 22, pp. 46-56, March 1977.

12. Mowday, R.T., Porter, L.W., and Steers, R.M., Employee-Organization Linkages: The Psychology of Commitment, Absenteeism, and Turnover, Academic Press, 1982.

13. Luthans, F., Baack, D., and Taylor, L., "Organizational Commitment: Analysis of Antecedents," Human Relations, V. 40, No. 4, pp. 219-236, 1987.

14. Muchinsky, P.M., and Tuttle, M.L., "Employee Turnover: An Empirical and Methodological Assessment," Journal of Vocational Behavior, V. 14, No. 1, pp. 43-77, February 1979.

15. Rand Report, Voluntary Terminations from Military Service, by R.M. Stolzenberg and J.D. Winkler, May 1983.

16. Marsh, R.M., and Mannari, H., "Organizational Commitment and Turnover: A Prediction Study," Administrative Science Quarterly, V. 22, pp. 57-74, 1977.

17. Waters, L.K., Waters, C.W., and Roach, D., "Estimates of Future Tenure, Satisfaction, and Biographical Variables as Predictors of Termination," Personnel Psychology, V. 29, pp. 57-60, 1976.

18. Mobley, W.H., Griffith, R.W., Hand, H.H., and Meglino, B.M., "Review and Conceptual Analysis of the Employee Turnover Process," Psychological Bulletin, V. 86, No. 3, pp. 493-522, 1979.

19. Newman, J.E., "Predicting Absenteeism and Turnover: A Field Comparison of Fishbein's Model and Traditional Job Attitude Measures," Journal of Applied Psychology, V. 59, No. 5, pp. 610-615, 1974.

20. Naval Personnel Research and Development Center Technical Report 87-29, Incentive Magnitude, Job Satisfaction, Perceived Stress, and Performance: Interrelationships in an Organizational Simulation, by B.L. Cooper, July 1987.

21. Mottaz, C., "Determinants of Organizational Commitment," Human Relations, V. 41, No. 6, pp. 467-482, 1988.

22. Proctor, J.H., Lassiter, W.E., and Soyars, W.D. III, "Prediction of Young U.S. Naval Officer Retention," Personnel Psychology, V. 29, pp. 567-581, 1976.

23. Mobley, W.H., "Intermediate Linkages in the Relationship Between Job Satisfaction and Employee Turnover," Journal of Applied Psychology, V. 62, No. 2, pp. 237-240, 1977.

24. Miller, H.E., Katerberg, R., and Hulin, C.L., "Evaluation of the Mobley, Horner, and Hollingsworth Model of Employee Turnover," Journal of Applied Psychology, V. 64, No. 5, pp. 509-517, 1979.

25. Mobley, W.H., Horner, S.O., and Hollingsworth, A.T., "An Evaluation of Precursors of Hospital Employee Turnover," Journal of Applied Psychology, V. 63, No. 4, pp. 408-414, 1978.

26. Dalessio, A., Siverman, W.H., and Schuck, J.R., "Paths to Turnover: A Re-analysis and Review of Existing Data on the Mobley, Horner, and Hollingsworth Model," Human Relations, V. 39, No. 3, pp. 245-263, 1986.

27. Michaels, C.E., and Spector, P.E., "Causes of Employee Turnover: A Test of the Mobley, Griffeth, Hand, and Meglino Model," Journal of Applied Psychology, V. 67, No. 1, pp. 53-59, 1982.

28. Arnold, H.J., and Feldman, D.C., "A Multivariate Analysis of the Determinants of Job Turnover," Journal of Applied Psychology, V. 67, No. 3, pp. 350-360, 1982.

29. Kraut, A.I., "Predicting Turnover of Employees From Measured Job Attitudes," Organizational Behavior and Human Performance, V. 13, pp. 233-243, 1975.

30. Porter, L.W., and Steers, R.M., "Organizational, Work, and Personal Factors in Employee Turnover and Absenteeism," Psychological Bulletin, V. 80, No. 2, pp. 151-176, 1973.

31. Hill, R.E., and Miller, E.L., "Job Change and the Middle Season's of a Man's Life," Academy of Management Journal, V. 24, No. 1, pp. 114-127, 1981.

32. Shikiar, R., and Freudenberg, R., "Unemployment Rates as a Moderator of the Job Dissatisfaction-Turnover Relation," Human Relations, V. 35, No. 9, pp. 845-854, 1982.

33. Mueller, C.W., and Price, J.L., "Some Consequences of Turnover: A Work Unit Analysis," Human Relations, V. 42, No. 5, pp. 389-402, 1989.

34. Johnston, M.W., and Futrell, C.M., "Functional Salesforce Turnover: An Empirical Investigation into the Positive Aspects of Turnover," Journal of Business Research, V. 18, No. 2, pp. 141-157, March 1989.

35. Naval Personnel Research and Development Center Special Report 82-3, Assessment of Civilian Personnel Management and Equal Opportunity Issues, by T.J. Koslowski, October 1981.

36. Rand Report, Families and Mission: A Review of the Effects of Family Factors On Army Attrition, Retention, and Readiness, by G. Vernez and G.L. Zellman, August 1987.

37. Naval Personnel Research and Development Center Technical Report 89-11, Officer Career Development: Modeling Married Aviator Retention, by R.A. Bruce, and R.L. Burch, June 1989.

38. Cook, R.W., Reenlistment Behavior of Nuclear-trained Enlisted Men, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1988.

39. Center for Naval Analysis Report, Issues in Navy Manpower Research and Policy: An Economists Perspective, by J.T. Warner, December 1981.

40. Rand Report, Active and Reserve Force Attrition and Retention: A Selected Review of Research and Methods, by Z.D. Doering, and D.W. Grissner, March 1985.

41. Naval Personnel Research and Development Center Technical Report 84-37, Prediction of Turnover Intentions Among Civilian Engineers Employed at Navy Industrial Facilities, by A.J. Farkas, March 1984.

42. Hayden, L.P., Factors Influencing the Career Orientation Of Junior Officer's in the United States Army, Master's Thesis, Naval Postgraduate School, Monterey, California, 1985.

43. Powers, F.W., A Study of Nuclear Submarine Officer Retention Factors, Master's Thesis, Naval Postgraduate School, Monterey, California, September 1977.

44. Department of Defense Manpower Requirements for FY 1990, February 1989.

45. Dickens, G.R., Manning the Nuclear Submarine Force of the 1980's and Beyond: An Officer Study, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1982.

46. Bowman, W.R., Do Engineers Make Better Naval Officers? An Empirical Test of the Rickover Hypothesis, United States Naval Academy, Annapolis, Marvland, August 1988.

47. Rand Report, A Dynamic Retention Model for Air Force Officers, December 1984.

48. Naval Personnel Research and Development Center Technical Report 83-30, Methods for Forecasting Officer Loss Rates, by B. Siegal, 1983.

49. SAG Corporation, An Introduction to the Annualized Cost of Leaving (ACOL) Model, by P.C. Mackin, and L.S. Mairs, 28 April 1989.

50. Naval Personnel Research and Development Center Technical Report, The Navy Officer Force Projection (ORPO) Model, March 1983.

51. Center for Naval Analysis Research Memorandum 87-43, The Effects of Selective Reenlistment Bonuses on Retention, by D.J. Cymrot, March 1987.

52. Ashcraft, R.J., An Analysis of the Factors Affecting the Career Orientation of Junior Unrestricted Line Naval Officers, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1987.

53. Schmidt, W.H., Factors Influencing the Career Orientation of Junior Officers in the United States Navy, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1982.

54. Center for Naval Analysis, Is There Such a Thing as Overall Satisfaction With Military Life? A Factor Analysis of Marine Corps Data, by E.S. Cavin, February 1988.

55. Center for Naval Analysis, Are Satisfaction and Dissatisfaction Really Opposites: Ordered vs. Unordered Models of Satisfaction With Military Life, by E.S. Cavin, January 1989.

56. Derr, C.B., Career Switching and Career Strategies Among U.S. Naval Officers, Naval Postgraduate School, Monterey, California, July 1979.

57. Derr, C.B., Career Switching and Organizational Politics Among Naval Officers, Naval Postgraduate School, Monterey, California, 1981.

58. Derr, C.B., A Theory and Research Instruments for Studying U.S. Naval Officer Careers, Naval Postgraduate School, Monterey, California, August 1977.

59. Derr, C.B., Junior Officer Retention--Another Perspective, Naval Postgraduate School, Monterey, California, January 1980.

60. Derr, C.B., More On Career Anchor Concepts: The Case of U.S. Navy Officers, Naval Postgraduate School, Monterey, California, September 1979.

61. Naval Personnel Research and Development Center, Civilian Manpower Planning Model for Scientific and Engineering Personnel in the Navy R and D Centers, by T.T. Liang, February 1983.

62. Eitelberg, M.J., "For Military Manpower, Tough Times Ahead," Wings of Gold, pp. 27-29, Summer 1988.

63. Economic Report of the President-- 1988, United States Government Printing Office, February 1988.

BIBLIOGRAPHY

Baughman, J.D., and Darnell, M.L., An Investigation of the Effects of Pay Inequity, Organizational Commitment, and Job Satisfaction on Career Intent, Master's Thesis, Air Force Institute of Technology, Wright-Patterson Air Force Base, Ohio, 1982.

Cawsey, T.F., Reed, P.L., and Redden, J.R., "Human Needs and Job Satisfaction: A Multidimensional Approach," Human Relations, V. 35, No. 9, pp. 703-715, 1982.

Center for Naval Analysis Report 98, Career Development of Scientists and Engineers within the Naval Material Command, Vol. I-III, by W.J. Hurley, R.F. Dewalt, and A. Klotz, November 1984.

Center for Naval Analysis Research Memorandum 88-87, Surface Warfare Community Structure: The First Eight Years of Service, by R.L. Peck, July 1988.

Cherniss, C., and Kane, J.S., "Public Sector Professionals: Job Characteristics, Satisfaction, and Aspirations for Intrinsic Fulfillment Through Work," Human Relations, V. 40, No. 3, pp. 125-136, 1987.

Description of Officers and Enlisted Personnel in the U.S. Armed Forces, V. 1-3, Defense Manpower Data Center, Monterey, California, 1986.

Ehrenberg, R.G., and Smith, R.S., Modern Labor Economics, 3rd ed., Scott, Foresman and Co., 1988.

Gottiker, U.E., and Larwood, L., "Predictors for Managers' Career Mobility, Success, and Satisfaction," Human Relations, V. 41, No. 8, pp. 569-591, 1988.

Gujarati, D.N., Basic Econometrics, McGraw-Hill Book Co., 1985.

Jacobs, T.O., A Guide for Developing Questionnaire Items, Human Resources Research Organization, Fort Benning, Georgia, January 1970.

Johnston, I., Turnover of Junior Army Officers: A Test of the Mobley, Griffith, Hand, and Meglino Model of Personnel Turnover, Using Structural Equation Techniques, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1988.

"Labor Letter", Wall Street Journal, p. 1, 20 January 1987.

"Labor Letter", Wall Street Journal, p. 1, 7 February 1989.

"Labor Letter", Wall Street Journal, p. 1, 14 February 1989.

"Labor Letter", Wall Street Journal, p. 1, 4 April 1989.

Lopez, T., Retention of Junior Officers in the Surface Navy, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1973.

Morey, R.C., and McCann, J.M., "Armed Services Recruiting Research: Issues, Findings, and Needs", Naval Ressearch Logistics Quarterly, V. 30, No. 4, December 1983.

Naval Avionics Center, Naval Avionics Center Workforce Indicators, March 1989.

Naval Personnel Research and Development Center Technical Report 76-47, Work Performance: A New Approach to Expectancy Theory Predictions, by D.M. Nebeker and M.C. Moy, September 1976.

Naval Personnel Research and Development Center Technical Note 82-15, The Civilian Workforce in Military Organizations: An Annotated Bibliography, by T.J. Koslowski, L.A. Broedling, and S.W. Duckrow, May 1982.

Naval Personnel Research and Development Center Technical Report 84-10, The Measurement of Organizational Functioning and Quality of Worklife, by A.J. Farkas, December 1983.

Naval Personnel Research and Development Center Technical Note 88-39, Dimensions of Job Performance, April 1988.

O'Reilly, C.A. III, and Caldwell, D.F., "Job Choice: The Impact of Intrinsic and Extrinsic Factors on Subsequent Satisfaction and Commitment," Journal of Applied Psychology, V. 65, No. 5, pp. 559-565, 1980.

Payne, S.E., Socioeconomic Determinants Impacting Air Force Officer Retention, Master's Thesis, Naval Postgraduate School, Monterey, California, December 1988.

Rand Report, Organizing Survey Research to Support Military Manpower Policies, by Z.D. Doering, March 1982.

Rand Report, Job Mobility and the Careers of Young Men, by R.H. Topal and M.P. Ward, November 1986.

Rand Report, Incremental Costs of Military and Civilian Manpower in the Military Services, by A.R. Palmer and D.J. Osbaldeston, July 1988.

Reibstein, L., "Are Some Workers Bound to be Unhappy?," Wall Street Journal, p. 27, 18 April 1988.

Reibstein, L., "What About Workers Who are Left Behind?," Wall Street Journal, p. 21, 15 January 1988.

SAS User's Guide: Basics, version 5 ed., SAS Institute Inc., 1985.

SAS User's Guide: Statistics, version 5 ed., SAS Institute Inc., 1985.

Schneider, J., "The 'Greener Grass' Phenomenon: Differential Effects of a Work Context Alternative on Organizational Participation and Withdrawal Intentions," Organizational Behavior and Human Performance, V. 16, pp. 308-333, 1976.

Starcevich, M.M., "The Relationship Between the 'Central Life Interests' of First-Line Managers, Middle Managers, and Professional Employees and Job Characteristics as Satisfiers and Dissatisfiers," Personnel Psychology, V. 27, pp. 107-115, 1973.

Stoner, J.A.F., and Wankel, C., Management, 3rd ed., Prentice-Hall, Inc., 1986.

"Today's Students Say Money Isn't Everything," Wall Street Journal, p. 29, 7 October 1988.

Van Maanen, J., and Katz, R., "Individuals and Their Careers: Some Temporal Considerations for Work Satisfaction," Personnel Psychology, V. 29, pp. 601-616, 1976.

Vilidas, J.M., The Book Of Survey Techniques, Havemeyer Books, 1982.

1985 DOD Survey of Officer and Enlisted Personnel User's Manual and Codebook, Defense Manpower Data Center, Arlington, Virginia, 1986.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, Virginia 22304-6145	2
2.	Library, Code 0142 Naval Postgraduate School Monterey, California 93943-5002	2
3.	Commanding Officer Attn: Larita Killian (Code 530) Naval Avionics Center Indianapolis, Indiana 46219-2189	6
4.	Professor Benjamin J. Roberts, Code 54Ro Naval Postgraduate School Monterey, California, 93943-5000	3
5.	Professor Kenneth W. Thomas, Code 54Th Naval Postgraduate School Monterey, California 93943-5000	2
6.	Professor Linda Gorman, Code 54Gr Naval Postgraduate School Monterey, California 93943-5000	1
7.	LCDR Thomas E. Lindner, USN 244 Overholt Drive Virginia Beach, Virginia 23464	2
8.	LT Mark E. Davis, USN 1034 Halsey Drive Monterey, California 93940	2
9.	Professor George Thomas, Code 54Te Naval Postgraduate School Monterey, California 93943-5000	1

END